

JVC

SERVICE MANUAL

VIDEO CASSETTE RECORDER **VHS**

HR-D300E/EG



HQ

VPSystem
VIDEO PROGRAM

INDEX
VHS-INDEX-SUCHLAUF

HYPERBAND OST
EMPFANG

SPECIFICATIONS

Format	: VHS PAL standard	Signal-to-noise ratio	: 43 dB (Rohde & Schwarz noise meter)
Recording system	: Rotary, two-head helical scan system with a slant double-azimuth combination video head	Horizontal resolution	: 250 lines
Video signal system	: PAL colour and CCIR monochrome signals, 625 lines	Audio	
Tape width	: 12.65 mm	Input	: -3.8 dBs (CENELEC standard), more than 10 k-ohms, unbalanced
Playing time	: 240 min. with E-240 video cassette	Output level	: -3.8 dBs (CENELEC standard), high impedance load
Temperature		Output impedance	: Less than 1 k-ohm, unbalanced
Operating	: 5°C to 40°C	Signal-to-noise ratio	: More than 40 dB
Storage	: -20°C to 60°C	Frequency range	: 70 Hz to 10,000 Hz
Channel coverage	: VHF 47 - 89 MHz, 104 - 300 MHz, 302 - 470 MHz UHF 470 - 862 MHz	Timer	: 14-day/4-programme timer
Aerial output	: UHF channels 32 - 40 (adjustable)	Dimensions	: 435 mm(W) x 95 mm(H) x 341 mm(D)
Power consumption	: 28 watts	Weight	: 6.5 kg
Power requirement	: 220 V~, 50/60 Hz	Provided accessories	: Aerial cable, Infrared remote control unit, "R6" battery x 2
Video		<i>Design and specifications subject to change without notice.</i>	
Input	: 0.5 to 2.0 Vp-p, 75 ohms, unbalanced		
Output	: 1.0 Vp-p, 75 ohms, unbalanced		

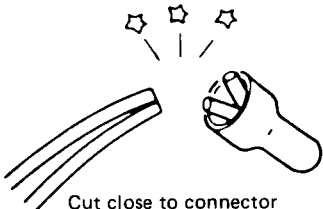
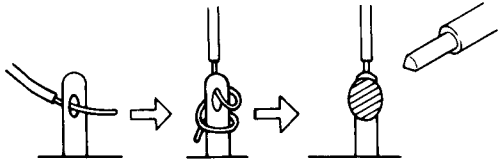
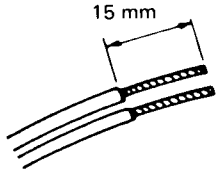
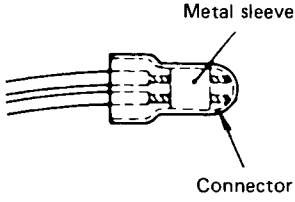
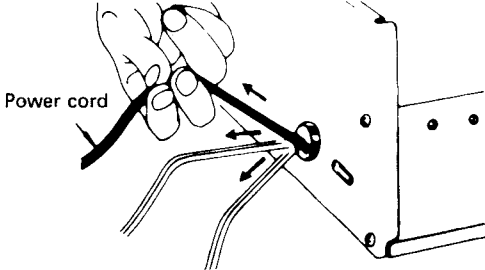
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Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

●Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.	10. Products using cathode ray tubes (CRTs) In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.
2. Parts identified by the  symbol and shaded (■) parts are critical for safety. Replace only with specified part numbers. Note: Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.	11. Crimp type wire connector In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps. 1) Connector part number : E03830-001 2) Required tool : Connector crimping tool of the proper type which will not damage insulated parts. 3) Replacement procedure (1) Remove the old connector by cutting the wires at a point close to the connector. Important : Do not reuse a connector (discard it).
3. Use specified internal wiring. Note especially: 1) Wires covered with PVC tubing 2) Double insulated wires 3) High voltage leads	 Cut close to connector
4. Use specified insulating materials for hazardous live parts. Note especially: 1) Insulation Tape 2) PVC tubing 3) Spacers 4) Insulation sheets for transistors	(2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.
5. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.  Fig. 1	 15 mm
6. Observe that wires do not contact heat producing parts (heat-sinks, oxide metal film resistors, fusible resistors, etc.)	(3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.
7. Check that replaced wires do not contact sharp edged or pointed parts.	 Metal sleeve Connector
8. When a power cord has been replaced, check that 10–15 kg of force in any direction will not loosen it.  Power cord Fig. 2	Fig. 5
9. Also check areas surrounding repaired locations.	

- (4) As shown in Fig. 6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

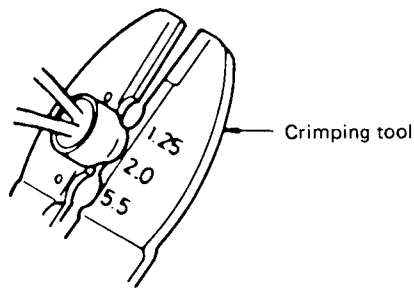


Fig. 6

- (5) Check the four points noted in Fig. 7.

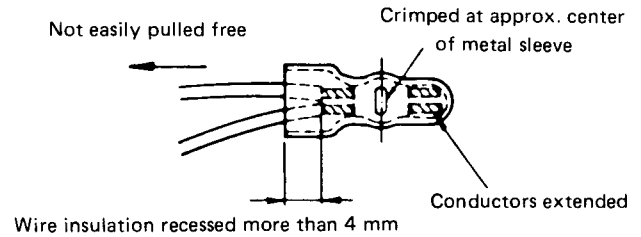


Fig. 7

● Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions. Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. Insulation resistance test

Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table below.

2. Dielectric strength test

Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table below.

3. Clearance distance

When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table below.

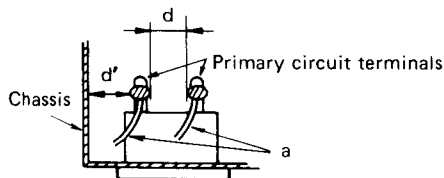


Fig. 8

4. Leakage current test

Confirm specified or lower leakage current between B (earth ground, power cord plug prongs) and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).

Measuring Method: (Power ON)

Insert load Z between B (earth ground, power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure and following table.

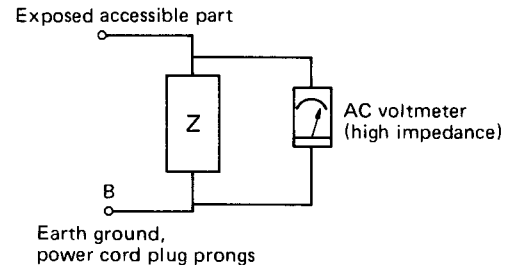


Fig. 9

AC Line Voltage	Region	Insulation Resistance	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	$\geq 1 \text{ M}\Omega/500 \text{ V DC}$	1 kV 1 minute	$\geq 3 \text{ mm}$
110 to 130 V	USA & Canada	—	900 V 1 minute	$\geq 3.2 \text{ mm}$
*110 to 130 V 200 to 240 V	Europe Australia	$\geq 10 \text{ M}\Omega/500 \text{ V DC}$	4 kV 1 minute	$\geq 6 \text{ mm (d)}$ $\geq 8 \text{ mm (d')}$ (a: Power cord)

*Class II model only.

Table 1 Ratings for selected areas

AC Line Voltage	Region	Load Z	Leakage Current (i)	Earth Ground (b) to:
100 V	Japan	$1 \text{ k}\Omega$	$i \leq 1 \text{ mA rms}$	Exposed accessible parts
110 to 130 V	USA & Canada	$0.15 \mu\text{F}$ $1.5 \text{ k}\Omega$	$i \leq 0.5 \text{ mA rms}$	Exposed accessible parts
110 to 130 V 220 to 240 V	Europe Australia	$2 \text{ k}\Omega$	$i \leq 0.7 \text{ mA peak}$ $i \leq 2 \text{ mA dc}$	Antenna earth terminals
		$50 \text{ k}\Omega$	$i \leq 0.7 \text{ mA peak}$ $i \leq 2 \text{ mA dc}$	Other terminals

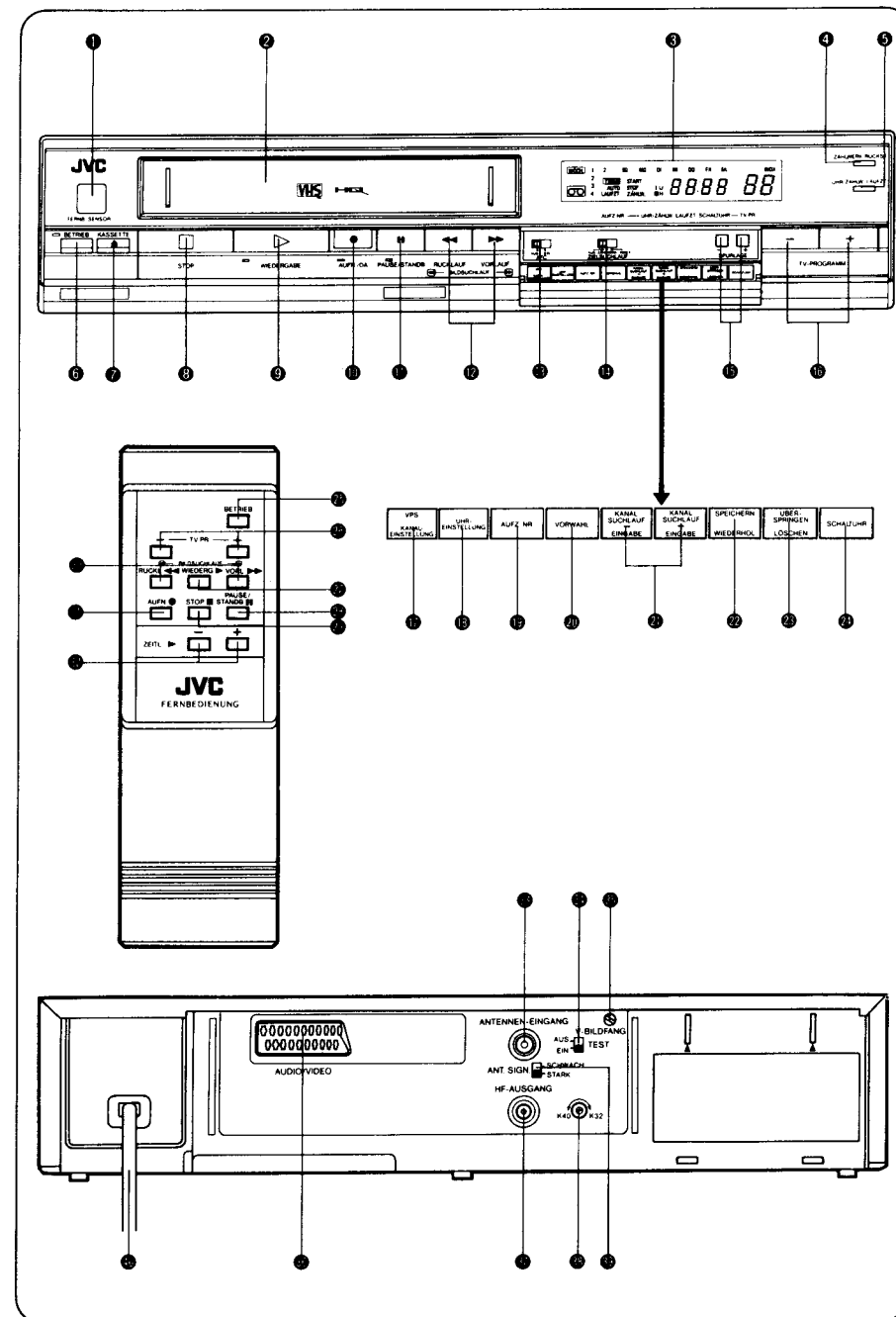
Table 2 Leakage current ratings for selected areas

Note: This table is unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.

Thank you for purchasing the JVC HR-D300EG Video Cassette Recorder. Before use, read this instruction booklet carefully for obtaining the best results from your new unit.

Diagrams are on the reverse side of this page. Fold it out and keep it opened so that you can refer to the diagrams when you are reading this booklet.

ENGLISH INSTRUCTIONS Page 15 – 28



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SAFETY PRECAUTIONS

The rating plate and the safety caution are on the rear of the unit.

WARNING – DANGEROUS VOLTAGE INSIDE

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.

IMPORTANT (In the United Kingdom) Mains Supply (240 V~, 50 Hz only)

IMPORTANT

Do not make any connection to the Larger Terminal coded E or Green. The wires in the mains lead are coloured in accordance with following code:



If these colours do not correspond with the terminal identifications of your plug, connect as follows:

Blue wire to terminal coded N (Neutral) or coloured Black.

Brown wire to terminal coded L (Live) or coloured Red.

If in doubt – consult a competent electrician.

Note

We recommend that you should disconnect the AC cord from the outlet.

FOR YOUR SAFETY (in Australia) Install any external aerial to AS 1417.1

Omkopplaren BETRIEB på denna apparat är sekundärt kopplad och skiljer inte apparaten från nätet i läge BETRIEB OFF.

The BETRIEB button does not completely shut off mains power from the unit, but switches operating current on and off.

BEMÆRK: I stilling OFF er apparatet stadig forbundet med lysnettet. Hvis det ønskes fuldstændig afbrudt skai netledningen trækkes ud.

This unit is produced to comply with Directive 82/499/EEC.

CAUTION

- Disconnect the mains plug from the supply socket when not in use.
- When you are not using the HR-D300EG for a long period of time, it is recommended that you disconnect the power cord from the AC outlet.
- Dangerous voltage inside. Refer internal servicing to qualified service personnel. To prevent electric shock or fire hazard, remove the power cord from the AC outlet prior to connecting or disconnecting any signal lead or aerial.



- Only cassettes marked "VHS" can be used with this video cassette recorder.
- HQ VHS is compatible with existing VHS equipment.

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FEATURES

High-quality pictures

- **HQ (High Quality) System technologies** with a Detail Enhancer, and 20 % higher white clip level.
- **Double-Azimuth 3-head (DA-3) system** for noiseless stills and frame advance.
- **Variable-speed slow motion** at 1/6, 1/12, 1/18, 1/24 and 1/30 normal speed.

Advanced tape access features

- **VHS Index Search System** facilitates location of the beginning of each recording by automatically marking an index code on the control track of the tape; index codes can be detected in the Shuttle Search mode. This system is based on the newly standardised CTL coding system for VHS.
- Counter search for returning to a designated point on a tape.

Convenient automatic functions

- **Auto play function:** insert a cassette (with safety tab removed), and playback will start automatically.
- **Next-function memory** allows a command to be entered immediately after pressing RÜCKLAUF (or VORLAUF), with the second command "remembered" and performed automatically after the tape rewinds to its beginning or fast-forwards to the counter reading of "0000".
 - Memory play: for automatic start of playback.
 - Memory eject: to eject the cassette after rewind, without waiting for completion of rewind.
 - Memory timer standby: to engage the timer recording standby mode after rewind.
 - Memory power-off: to turn the power off after rewind.
- Automatic backspace editing.
- Auto-power-on convenience.
- Power-off ejection.
- Automatic rewind at the end of tape.

Other value features

- **Voltage synthesized wide-band cable tuner** with 48-channel preset capacity; can receive VHF, UHF and cable channels including those of hyper band.
- **Compatible with VPS (Video Programme System)** with built-in VPS decoder.
- **14-Day/4-event programmable timer.**
- **Overlapped programme warning:** programme numbers on the FDP blink when the preset time spans of the programmes overlap.
- **Timer programme review** to show the preset programme contents in the order of execution.
- **Infrared remote control.**
- **On-screen record-pause mode display** with elapsed time indicated by shrinking white bar.
- Electronic tracking controls.
- Instant timer recording function using the record button.
- **Shuttle Search with latch function:** with the Shuttle Search button locked or held depressed, offers high-speed playback at 9 times normal speed in either direction.
- Comprehensive fluorescent display.
- Elapsed recording time indicator.

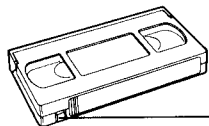
PRECAUTIONS

Handling and storage

- Avoid using the recorder under the following conditions:
 - extremely hot, cold or humid places,
 - dusty places,
 - near appliances generating strong magnetic fields,
 - places subject to vibrations, and
 - poorly ventilated places.
- Be careful of moisture condensation. Avoid using the recorder immediately after moving from a cold place to a warm place. The water vapour in warm air will condense on the still-cold video head drum and tape guides and may cause damage to the tape and the recorder.
- Handle the recorder carefully.
 - Do not block the ventilation openings.
 - Do not place anything heavy on the recorder.
 - Do not place anything which might spill and cause trouble on the top cover of the recorder.
 - Use in horizontal (flat) position only.
- In case of transportation,
 - Avoid violent shocks to the recorder during packing and transportation.
 - Before packing, be sure to remove the cassette from the recorder.

Video cassettes

- This recorder employs VHS-type cassettes only. E-240 for 4 hours, E-180 for 3 hours, E-120 for 2 hours, E-90 for 1 hour and 30 minutes, E-60 for 1 hour and E-30 for 30 minutes of recording.
- Video cassettes are equipped with a safety tab to prevent accidental erasure. When the tab is removed, recording cannot be performed. If you wish to record on a cassette whose tab has already been removed, use adhesive tape to block the hole.



Safety tab

- Avoid exposing the cassettes to direct sunlight. Keep them away from heaters.
- Avoid extreme humidity, violent vibrations or shocks, strong magnetic fields (near a motor, transformer or magnet) and dusty places.
- Place the cassettes in cassette cases and position vertically.

Moisture condensation

- If you pour a cold liquid into a glass, water vapour in the air will condense on the surface of the glass. This is called moisture condensation.
- Moisture condensation on the head drum, one of the most crucial parts of the video recorder, will cause damage to the tape.
- Moisture condensation is apt to occur under the following conditions:
 - when the recorder is moved from a cold place to a warm place, and
 - under extremely humid conditions.
- In conditions where moisture condensation may occur, keep the power cord plugged in an AC outlet and the BETRIEB switch set to ON; this would help prevent condensation from occurring. When condensation has occurred, it will not evaporate quickly once the power is switched on. Wait a few hours for the recorder to become dry.

Operation

- When a cassette is loaded, the power is switched on automatically.
- The cassette can be unloaded even when the power is off. Pressing the KASSETTE button turns the power on and, after ejection of the cassette, shuts it off automatically in this case.
- As long as the SCHALTUHR button is engaged with the TIMER indicator lit, the BETRIEB and KASSETTE buttons have no effect and unloading of a cassette is not possible. If a cassette has not yet been inserted, simply insert a cassette; the power will be switched on to load the cassette properly and, after completion of automatic loading, the Timer Recording Standby mode will be engaged with power off.

Remote control unit

- Avoid violent shocks, especially take care not to drop the unit.
- Take care not to allow liquid to spill into the unit.
- Do not place heavy objects on the unit.
- Avoid leaving the unit in places subject to direct sunlight or extremely high temperatures.

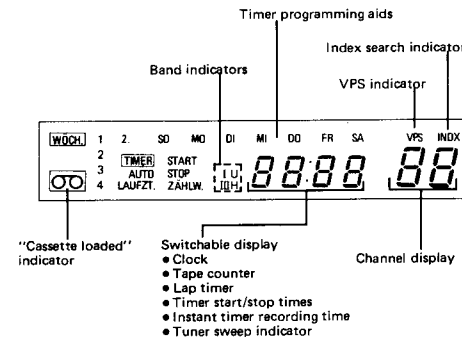
WARNING

1. This recorder can also receive colour television signals in East Germany (DDR) for recording and playback.
2. Recordings made of DDR television signals produce monochrome pictures if played back on another video recorder of PAL or SECAM standard.
3. SECAM prerecorded cassettes or recordings made with a SECAM video recorder produce monochrome pictures when played back with this recorder.
4. This recorder cannot be used in France. Use a SECAM recorder to record French SECAM signals.

CONTROLS, INDICATORS AND CONNECTORS Refer to the diagrams on the front foldout page.

Front Panel

- 1 **Infrared beam receiving window (FERNB. SENSOR)**
- 2 **Cassette loading slot**
Insert a VHS cassette. The door will close and the "cassette loaded" indicator will appear on the FDP (fluorescent display panel).
- 3 **Fluorescent display panel**
Fully explained in relevant sections.



- 4 **Counter reset button (ZÄHLWERK-RÜCKST.)**
Press to reset the counter reading or lap time to "0000" or "0:00" respectively.
- 5 **Clock/Counter/Lap button (UHR/ZÄHLW./LAUFZT.)**
Press to switch the display among clock, tape counter (ZÄHLW.) and lap time (LAUFZT.). Also used to change the display from the timer programming mode to the clock mode.
- 6 **Operate button (BETRIEB) with LED indicator**
Press to apply operating power to the recorder. The indicator will light. Loading a cassette also turns the power on.
- 7 **Cassette eject button (KASSETTE)**
- 8 **STOP button**
Press to stop the tape.
- 9 **Play button (WIEDERGABE) with LED indicator**
Press to play back the tape or cancel the Pause/Still and Search modes.
- 10 **Record/Instant timer record button (AUFN. DA) with LED indicator**
Press once to start recording. Pressing it again engages the Instant Timer Recording mode. See page 23.
- 11 **Pause/Still button (PAUSE/STANDB.) with LED indicator**
Press to stop the tape temporarily to avoid recording of unwanted material or to view a still picture. The still picture can be advanced step by step or continuously.
- 12 **Rewind and Fast-Forward (Shuttle Search) buttons (RÜCKLAUF and VORLAUF) (BILDSUCHLAUF)**
Press while in the Stop mode to rewind or fast-forward the tape; press while in the Play mode to view the speeded-up picture for programme search. See pages 22 and 24.
- 13 **AFC switch**
Normally set to EIN.
- 14 **Tape memory switch (ZIELSUCHLAUF)**
ZÄHLWERK: The tape will stop automatically at the counter reading of about "0000" in the Rewind or Fast Forward mode. See page 24.

- INDEX: The index code marked at the beginning of each recording will be detected in the Shuttle Search mode for automatic start of playback. See page 24.
- AUS: Set to AUS if you are not going to use either of the two functions.

- 15 **Tracking +/- buttons (SPURLAGE)**
Press either button to minimise noise bars, if observed, during playback.
- 16 **TV programme +/- buttons (TV-PROGRAMM)**
Press either button to select a desired channel.
- 17 **VPS/Channel set button (VPS/KANALEINSTELLUNG)**
A dual-function switch. Serves as a VPS command enter button in timer programming (see page 26). Normally functions to engage or disengage the tuner preset mode (see page 21).
- 18 **Clock adjust button (UHREINSTELLUNG)**
Press to adjust the clock.
- 19 **Programme button (AUFZ. NR.)**
Press to programme the timer.
- 20 **Select button (VORWAHL)**
Press to select the band in tuner presetting; press to select the item to be set in clock setting or timer programming.
- 21 **Channel search/Set +/- buttons (KANAL SUCHLAUF/EINGABE)**
Press to search for broadcast programmes in tuner presetting; press to set to the correct data in clock setting or timer programming.
- 22 **Store/Repeat button (SPEICHERN/WIEDERHOL.)**
Press to store the tuned-in channel in tuner presetting; press to enter the repeat command in timer programming.
- 23 **Skip/Cancel button (ÜBERSPRINGEN/LÖSCHEN)**
Press to skip unnecessary channels in tuner presetting; press to cancel the preset programme in timer programming.
- 24 **Timer button (SCHALTUHR)**
Press to engage the timer recording standby mode.

Remote Control Unit

- 25 **Operate button (BETRIEB)**
Press to turn the recorder power on or off.
- 26 **TV PR. +/- buttons**
Press either button to select a desired channel.
- 27 **Play button (WIEDERG.)**
- 28 **Pause/Still button (PAUSE/STANDB.)**
- 29 **STOP button**
- 30 **Rewind and Fast-Forward (Shuttle Search) buttons (RÜCKL. and VORL.) (BILDSUCHLAUF)**
- 31 **Record button (AUFNAHME)**
Press together with the WIEDERG. button to start recording.
- 32 **SLOW +/- buttons (ZEITL.)**
Press in the Play or Still mode to engage the Slow-Motion mode. To increase the speed, press "+" button, to decrease the speed, press "-" button. (See page 22.)

Operating distance for remote control unit

- The maximum operating distance is about 8 m.

Installing the batteries

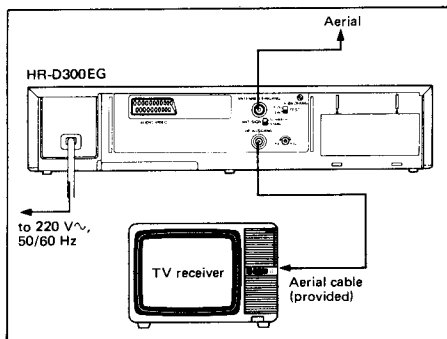
- Insert two "R6"-size batteries (provided) into the battery compartment on the rear of the remote control unit, observing correct polarity.

Rear Panel

- ➊ **Aerial input connector (ANTENNEN-EINGANG)**
Connect an aerial to this connector.
- ➋ **TEST signal switch**
Set to EIN when tuning your TV receiver for the video channel. A test signal in the form of two vertical white bars will be available.
- ➌ **Vertical lock adjustment screw (V-BILDFANG)**
When operating in the Still mode, adjust this screw to eliminate any vertical vibration of the picture. (For any inquiry about this adjustment, contact a JVC dealer.)
- ➍ **AUDIO/VIDEO socket**
A 21-pin standardised audio/video input/output socket for the connection to a TV or a 2nd video recorder equipped with the same type of socket. The input from this socket can be recorded in the AUX mode engaged by obtaining "AU" in the channel display.

- ➎ **RF output connector (HF-AUSGANG)**
Connect to the aerial terminal of a TV receiver through the aerial cable (provided).
- ➏ **RF converter frequency adjustment screw**
- ➐ **Attenuator switch (ANT. SIGN.)**
Set to SCHWACH to receive broadcasts from distant stations. Set to STARK to receive broadcasts of high field strength.
- ➑ **Power cord**

CONNECTIONS



1. Remove the aerial cable from the TV receiver and reconnect it to the recorder's ANTENNEN-EINGANG ➊ connector. The recorder is then ready to record off-air programmes.
2. Connect the recorder's HF-AUSGANG connector ➎ to the TV receiver's aerial terminal using the provided aerial cable. The TV receiver is then ready to receive broadcast programmes as well as accommodate video cassette playback.

VIDEO CHANNEL SETTING

- 1 Press the BETRIEB button ➊ to turn the power on. Turn on the TV receiver.
- 2 Set the TEST switch ➋ to EIN.
- 3 Adjust your TV receiver in the vicinity of UHF channel 36 until you bring in the two white signal bars on the screen as illustrated. This is your VIDEO CHANNEL.



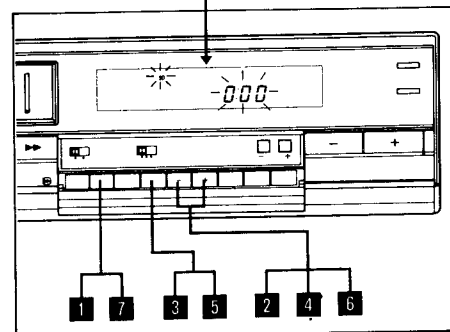
- 4 Reset the TEST switch to AUS.

Notes:

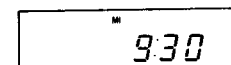
- If some interference noise is seen on the screen because of broadcasts on neighbouring channels or if your preset broadcasts should be affected in picture quality, it is necessary to shift the RF converter output frequency from that of channel 36. Consult your JVC dealer for making this adjustment.
- Video channel setting is also possible using a prerecorded VHS video cassette. Play back the tape and tune the TV receiver to obtain clear pictures and sound while monitoring the playback picture on the TV screen.
- If your TV receiver is not provided with an AFC circuit, perform fine tuning of the TV receiver when you are actually viewing video cassettes.

CLOCK SETTING

Plug the recorder into an AC outlet. The display shows a blinking SO 0:00.



- 1 Press UHREINSTELLUNG ➊. The indicated day will blink.
- 2 Press EINGABE ➋ until the correct day indication appears.
- 3 Press VORWAHL ➌. The indicated hour digits will blink.
- 4 Press EINGABE until the correct hour indication appears.
- 5 Press VORWAHL. The indicated minute digits will blink.
- 6 Press EINGABE until the correct minute indication appears.
- 7 Press UHREINSTELLUNG at the exact instant of the time signal and clock will be set accurately to the present time.



Power failure indicator

The blinking SO 0:00 (initial condition of the display) is also a power failure indicator, showing that there has been a power failure exceeding 10 seconds. Re-adjusting the time restores the normal condition of the clock display.

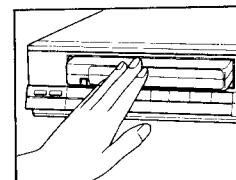
Note:

- Clock setting is not possible in the timer recording standby mode. First check to see that the TIMER indicator on the FDP is not lit.

LOADING AND UNLOADING A CASSETTE

Loading

Insert a cassette as illustrated. Be sure to insert it firmly into the slot; otherwise, it will be automatically ejected.



- The automatic loading mechanism will operate only when the cassette is inserted correctly.
- With a cassette inserted, the "cassette loaded" indicator will appear on the FDP.

AUTO POWER-ON AND AUTO PLAY SYSTEM

- The cassette can be loaded even when the power has not been turned on. Inserting a cassette into the loading slot turns the power on automatically.
- Inserting a cassette, with its safety tab removed, turns the recorder on and playback of the cassette begins automatically.

POWER-OFF EJECT SYSTEM

- The cassette can be unloaded even after the power has been turned off. Pressing the KASSETTE button turns the power on automatically and, after ejection of the cassette, shuts it off automatically.

Unloading

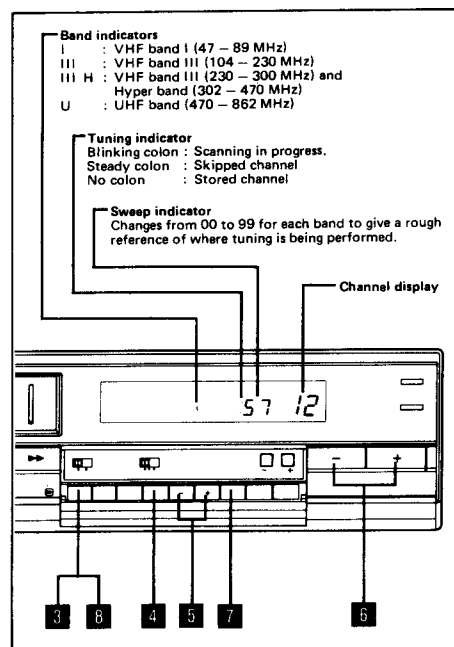
Press the KASSETTE button ➋

CAUTION

- If unloading of the cassette is not possible, check to see whether the TIMER indicator is lit. If so, press the SCHALTUHR button so the TIMER indicator extinguishes.
- Do not attempt to pull out the cassette once automatic loading has started.
- Do not insert fingers or any foreign object beyond the door of the cassette loading slot, as this could lead to injury or damage to the mechanism. Show special caution with children.

OPERATING THE BUILT-IN TUNER

The HR-D300EG incorporates a voltage synthesized tuner with 48-channel preset capacity. Only channels stored can be called up with the TV-PROGRAMM buttons in modes other than Channel Set. In the Channel Set mode, all channel numbers including skipped ones are successively displayed so that they can be stored or skipped.



Available channels in each band

Band indicator	Frequency	Channels
I	VHF band I (47 – 89 MHz)	E2 – E4 (Common European channels) S1 – S3 (Belgium) X, Y, Z (Switzerland)
III	VHF band III (104 – 230 MHz)	M1 – M10, 80 – 89 (Belgium) S1 – S10 (West Germany, Switzerland) E5 – E12 (Common European channels)
III H	VHF band III (230 – 300 MHz) Hyper band (302 – 470 MHz)	U1 – U10, 90 – 99 (Belgium) S11 – S41 (West Germany, Switzerland)
U	UHF band (470 – 862 MHz)	E21 – E69 (Common European channels)

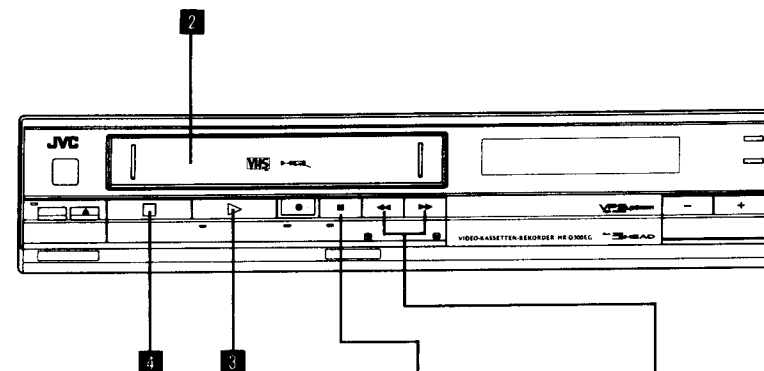
Storing channels

- Turn on the TV receiver and adjust it to your video channel.
- Turn on the recorder.
- Press KANALEINSTELLUNG ●.
- Press VORWAHL ● until the correct band indication appears.
- Press KANAL SUCHLAUF ● until the desired broadcast signal is detected; use either the “-” or “+” button depending on the direction of search.
 - The tuning indicator “colon” will blink and the sweep indicator will count down or up.
- Press TV-PROGRAMM ● to select the channel to be stored.
- Press SPEICHERN ●. The “colon” will disappear.
 - Repeat steps 4 through 7 for all necessary channels.
- Press KANALEINSTELLUNG to disengage the Channel Set mode.

Skipping channels

- Press TV-PROGRAMM to select the channel to be skipped.
- Press KANALEINSTELLUNG.
 - The band indicator and the sweep indicator corresponding to the broadcast stored in that channel will appear.
- Press ÜBERSPRINGEN ●. The steady “colon” will appear.
- Press KANALEINSTELLUNG to disengage the Channel Set mode.

PLAYING BACK A VIDEO CASSETTE



- Turn the TV receiver on and adjust it to your video channel.
- Load a pre-recorded cassette.
 - Power will be switched on automatically.
 - When the cassette loaded has no safety tab, playback will start automatically.
- Press WIEDERGABE ●.
- Press STOP ● at the end of the programme.
 - The tape will be rewound automatically when its end is reached and the recorder will enter the Stop mode.

SHUTTLE SEARCH

Shuttle Search allows high-speed playback at 9 times normal speed in either direction.

- Press either RÜCKLAUF or VORLAUF BILD-SUCHLAUF ● during playback.
- To cancel the Search mode, press WIEDERGABE.
 - For briefer scanning, keep the BILDSUCHLAUF button pressed for more than 2 seconds; when you release the button, the Search mode will be cancelled.

STILL PICTURE

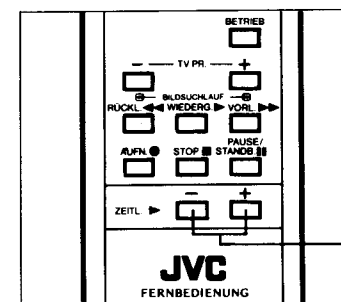
- Press PAUSE/STANDB. ● during playback.
- To advance the still picture, press PAUSE/STANDB. a number of times.
 - Keeping this button pressed continuously advances the picture to give a slow-motion effect.
- To cancel the Still mode, press WIEDERGABE.

Notes:

- When the Still mode continues for longer than about 5 minutes, the Stop mode will be entered automatically.
- With some televisions, the still picture may be unstable. This is not due to any defect of the unit.

Note:

Only SP (Standard Play) recordings can be played back.

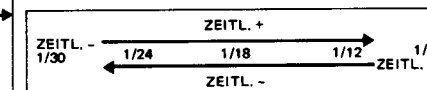


Tracking Adjustment

Noise bars may appear on the screen if you play back a tape which was recorded using another recorder. For correction, press either SPURLAGE control ●. Tracking will be reset to the preset standard each time the cassette is ejected.

SLOW-MOTION PLAYBACK

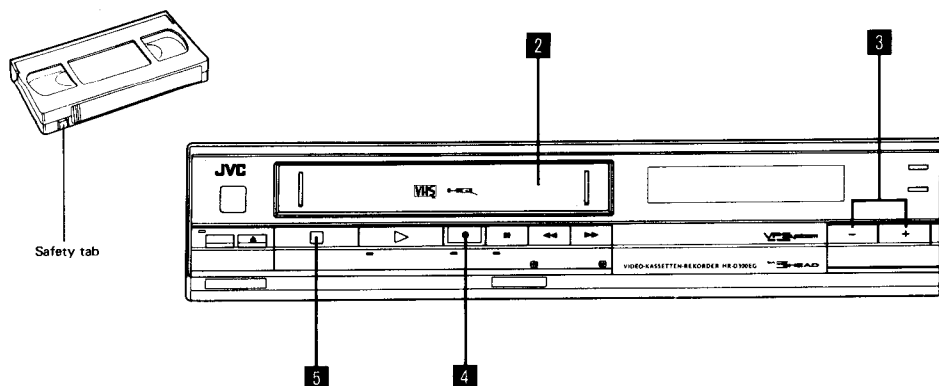
- Press the “-” button while in the Play or Still mode; slow-motion playback at 1/30 normal speed will start.
- Press the “+” button while in the Play or Still mode; slow-motion playback at 1/6 normal speed will start.
- Each time the “-” button is pressed, the tape speed becomes slower.
- Each time the “+” button is pressed, the tape speed becomes faster.



Note:

- With some video cassettes, the TV picture may distort during slow-motion playback. This is not due to any defect of the unit.

RECORDING TV PROGRAMMES



- 1 Turn the TV receiver on and adjust it to your video channel.
- 2 Load a cassette (with safety tab in place).
 - Power will be switched on automatically.
- 3 Press either TV-PROGRAMM ① to select the channel you wish to record.
- 4 Press AUFN./DA ② to start recording.
 - Be careful to press AUFN./DA only once, or Instant Timer Recording will begin.
 - Press AUFN. and WIEDERGABE simultaneously when using the remote control unit.
 - If there is part of the programme you don't want to record, press PAUSE/STANDBY ⑤. A white horizontal bar will appear on the screen, which reduces in size in 4 steps as time elapses. When the last quarter starts blinking and disappears, the Stop mode will be entered automatically. The pause duration is possible for about 5 minutes.

Pause mode indicator



- To continue recording from the Pause mode, press WIEDERGABE ③ while the white bar is on-screen.
- 5 Press STOP ④ at the end of the programme.
 - When the end of the tape is reached during recording, the tape is automatically rewound and stops.

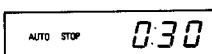
Notes:

- If you want to start recording from the Play mode, first engage the Record-Pause mode by pressing PAUSE/STANDBY, and then AUFN./DA. Then press WIEDERGABE.
- When recording is restarted from the Pause mode, a few frames recorded before are erased due to overlap of the new recording. This is not due to any defect of the unit.
- The selected channel cannot be altered during recording. If you wish to change the channel, first engage the Pause mode and then select a different channel.

INSTANT TIMER RECORDING

If you wish for recording to stop automatically after a certain period of time, use this Instant Timer Recording mode.

1. Press AUFN./DA during recording (or twice if in the Stop mode).
 - The FDP shows "AUTO STOP 0:30", showing that recording will automatically stop and power will switch off after 30 minutes.
2. Adjust the switch-off time, if necessary.
 - Press AUFN./DA to increase it in 30-minute increments (possible up to 4 hours).
 - Use VORWAHL and EINGABE to set to a more precise time when required (possible up to 4 hours 59 minutes). After setting the time, press VORWAHL so that all digits stop blinking.

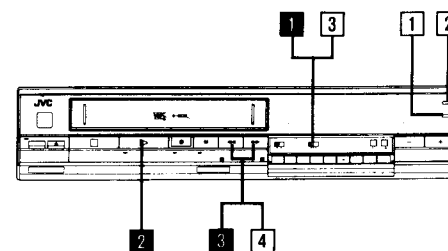


RECORDING ONE PROGRAMME WHILE WATCHING ANOTHER

A programme not being viewed can be recorded while you enjoy another programme.

- Select the channel you wish to record with the recorder's TV-PROGRAMM buttons.
- Select the channel you wish to view with the TV receiver's channel selector.

INDEX SEARCH AND COUNTER SEARCH



VHS Index Search System

When you start recording from the Stop, or Timer Standby mode, an index code is marked on the tape. These index codes can be detected in the Shuttle Search mode.

- 1 Set ZIELSUCHLAUF ① to INDEX.
- 2 Press WIEDERGABE ② to start playback.
- 3 Press RÜCKLAUF or VORLAUF BILDSUCHLAUF ③ depending on the direction of search.
 - While the tape is being scanned, "INDX" will be displayed on the FDP.
- 4 When the first index code is detected, normal playback resumes automatically. To search for the next index code, press the same button once again.

Counter Search

The counter reading of "0000" can be located automatically.

- 1 Press UHR/ZÄHLW./LAUFZT. ① to obtain the Counter mode.
- 2 Press ZÄHLWERK-RÜCKST. ② during playback or recording at a point which you wish to locate later.
- 3 Set ZIELSUCHLAUF to ZÄHLWERK.

- 4 Press RÜCKLAUF or VORLAUF when you need to return to the designated point.
 - The tape will stop automatically at about "0000".
 - When used in conjunction with the Memory Play function, this offers more convenience. See below.

ELAPSED RECORDING TIME INDICATOR

The tape counter is switchable to the elapsed recording time indicator.

1. Press UHR/ZÄHLW./LAUFZT. to obtain the Lap mode.
 - The lap time is counted up to 9 hours 59 minutes.
2. To reset the lap time to "0:00", press ZÄHLWERK-RÜCKST.

Notes:

- Unless the ZÄHLWERK-RÜCKST. button is pressed in the Lap mode, the count is maintained even after the power is switched off (as long as the unit remains plugged in to an AC outlet).
- When the Lap mode is engaged during playback, counting does not take place, even though the current count is displayed.

NEXT-FUNCTION MEMORY

Memory Play function

- If you want to watch the tape from its beginning after rewinding, press RÜCKLAUF and then WIEDERGABE within 2 seconds. Playback will start automatically at the beginning of the tape. (The ZIELSUCHLAUF switch must be in the AUS position.)
- If you want to watch the tape from the counter reading of "0000", set ZIELSUCHLAUF to ZÄHLWERK, press RÜCKLAUF (or VORLAUF) and then WIEDERGABE within 2 seconds.

Memory Eject/Power-Off/Timer Standby

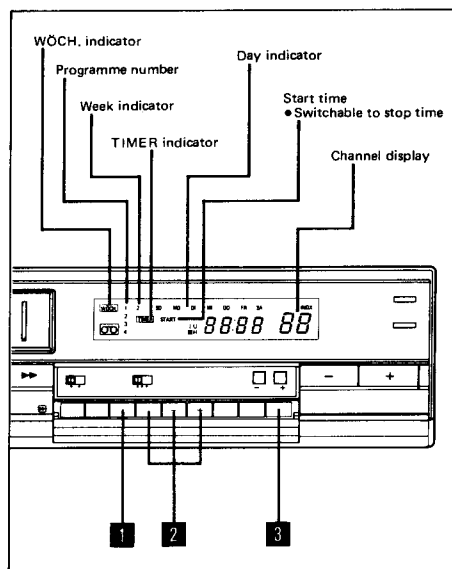
If you are going to eject the cassette, turn the power off or engage the Timer Standby mode after rewinding the tape, you do not have to wait for completion of rewind to press the corresponding button.

- To eject the cassette after rewind, press RÜCKLAUF and then KASSETTE within 2 seconds.
- To turn the power off after rewind, press RÜCKLAUF and then BETRIEB within 2 seconds.
- To engage the Timer Standby mode after rewind, press RÜCKLAUF and then SCHALTUHR within 2 seconds.

AUTOMATIC TIMER RECORDING



First of all, load a cassette (with safety tab in place); power will be switched on automatically.

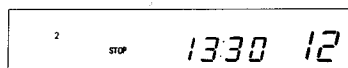


1 Press AUFZ. NR. ①.

- The display will change to the Timer Set mode for programme number "1". To advance to programme number 2, 3 or 4, press AUFZ. NR.

2 Set the day, start time, channel and stop time in succession by using the VORWAHL and EINGABE buttons ② ③ alternately.

- Select the item to be set with the VORWAHL button; the selected item will blink.
- Set the desired data with the EINGABE buttons.



Note:

- The 1st week refers to the seven-day period from the present day and the 2nd week, to the following seven-day

Setting the day

- With the EINGABE "+" button, the day indication advances from "SO" (first Sunday) to "SA" (first Saturday), then "2. SO" (second Sunday) to "2. SA" (second Saturday) and then the all-days indication with "WÖCH." for daily serial recording.
- For weekly serial recording, press the WIEDERHOL. button any time in the Timer Set mode.
- The "WÖCH." entry can be cancelled by pressing the WIEDERHOL. button.

Setting the start and stop times

- It is not possible to set the start and stop times unless the clock has previously been set.
- Enter the data while the digits are blinking.
- The stop time can be set within 24 hours from the start time.

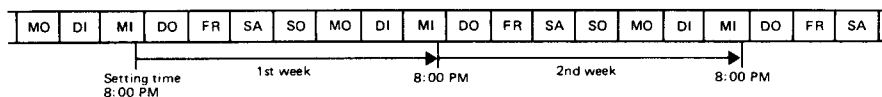
Cancelling the preset data

- The preset programmes can be cancelled. First engage the Timer Set mode for the programme number you wish to cancel and then press the LÖSCHEN ④ button.

3 After making sure that the cassette is loaded, press SCHALTUHR ④.

- The Timer Recording Standby mode will be engaged with the TIMER indicator and the preset programme number(s) illuminated and the power turned off.
- With no cassette loaded, the TIMER and "cassette loaded" indicators will continue blinking.
- A cassette whose safety tab has been removed will be ejected automatically.
- If a preset programme contains errors, that programme number will not be illuminated. Recheck the programmed data.
- If illuminated programme numbers are blinking, the time spans of those programmes overlap. Recheck their programmed data.

period (not weeks on the calendar). These two weeks are counted from the time of setting.



Reviewing the programmed data

- Press the AUFZ. NR. button in the Timer Standby mode; the programmed data of the earliest-to-start programme will be shown for 6 seconds (3 seconds for START and 3 seconds for STOP) and then those of subsequent programmes, if any, in the same manner.



- If you wish to change the programmed data, engage the Timer Set mode (first press the SCHALTUHR button to disengage the Timer Standby mode and then press the AUFZ. NR. button) and call up the corresponding programme number for reprogramming.

Timer recording operation

- When the preset start time is reached, recording starts.
- After timer recording, the power is switched off. If the tape end is reached during timer recording, the cassette is automatically ejected and the power is switched off.
- After all preset programmes have been executed, the Timer Standby mode is cancelled.

VPS RECORDING

In the VPS (Video Programme System) system, TV stations transmit different VPS codes for different TV programmes, which control the starting and stopping of the video recorder and have precedence over times preset in the timer for accurate recording of a particular programme from start to finish.

1 Press AUFZ. NR. ①.

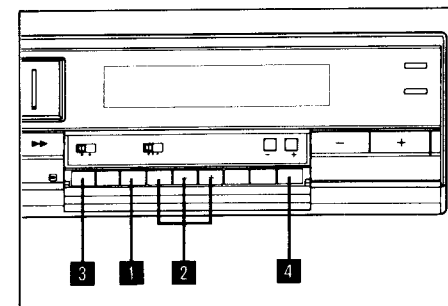
- Set the day, start time, stop time and channel in the same way as for timer programming.

2 Press VPS ②.

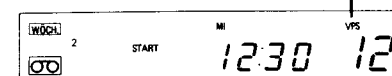
- All timer data will be converted to VPS codes and stored in memory.

3 Press SCHALTUHR ④.

- If the preset start time is between 4:00 and 23:59, the recorder will enter the VPS standby mode at 0:00 on the preset day and remain engaged until 4:00 on the following day, if the intended programme has not yet been broadcast.
- If the preset start time is between 0:00 and 3:59, the recorder will enter the VPS standby mode at 20:00 on the previous day.
- When a VPS code corresponding to the intended TV programme is detected during the VPS standby mode, recording will start. When the VPS code changes to another, recording will stop.
- When an interruption code is detected during VPS recording, the VPS standby mode is engaged and recording restarts when the regular VPS code is restored.



VPS indicator
Illuminated: VPS standby mode
Blinking: VPS recording in progress



Notes:

- If no VPS code is detected from that station or a system status code which cancels VPS recording is detected, ordinary timer recording will be engaged.
- Operation at the end of VPS recording is the same as with ordinary timer recording.

RECORDING FROM AN EXTERNAL SOURCE

By connecting an external video source (such as a VideoMovie camera-recorder, 2nd video recorder, video camera, etc.) to the AUDIO/VIDEO socket, recording and/or editing are possible.

- For connection of these units, an appropriate cable is necessary.
- For connection of a video camera, a camera adapter is also necessary. Consult a JVC dealer.

1. Turn the power on for all connected equipment.
2. Adjust the TV receiver to your video channel.
3. Load a cassette.
4. Press either TV-PROGRAMM button ● to obtain "AU" in the channel display.
5. Operate the source equipment properly.
6. Press AUFN./DA ●.
7. To stop recording temporarily, press PAUSE/STANDB. ●.
8. To end recording, press STOP ●.

Note:

- For the operation of the source equipment, refer to the instruction manual of the relevant machine.

IN CASE OF DIFFICULTY

What may initially appear to be trouble is not always a real problem. Make sure first . . .

Symptoms	Check points
No power is applied to the recorder.	• Is the power cord disconnected? Connect it.
Playback picture does not appear while the tape is running.	• Is the TV receiver's channel selector set to the correct video channel? Set to the RF converter channel.
Tape does not run in the Record mode.	• Is the PAUSE/STADB. button pressed? Press WIEDERGABE to release.
AUFN./DA button cannot be engaged.	• Is the cassette improperly loaded? Load it properly. • Is the safety tab broken? Reseal the slot.
Tape stops in the Rewind or Fast Forward mode.	• Is the ZIELSUCHLAUF switch set to ZÄHLWERK? Set to AUS.
Tape will not rewind.	• Is the tape already rewound to the end?
Noisy playback picture.	• Adjust with the SPURLAGE controls.
Pressing PAUSE/STANDB. during playback brings a still picture (in a frame-by-frame manner) with noise bars.	• Noise bars can be eliminated by pressing the PAUSE/STANDB. button a few more times.

This recorder contains microcomputers. External electronic noise or interference could cause malfunctioning. In such cases, switch the power off and unplug the power cord. Then plug it in again and check the functions.

HEAD CLEANING

- Picture playback may become blurred or interrupted while the TV programme received is clear. This does not mean that the recorded programme has been erased.
- Dirt accumulated on the video heads after long periods of use causes such problems. In this case, head cleaning requiring highly technical care is necessary.

For head cleaning, consult the nearest JVC dealer.

1.1.3 Disassembly (external covers)

1. Top cover

- 1) Take out five screws from the right, left and rear sides of the set.
- 2) Tilt up the rear end of the top cover, then remove the top cover.

2. Bottom cover

- 1) Take out five screws from the bottom side of the set.
- 2) Set free the bottom cover from six claws of the chassis in order to remove the bottom cover.

3. Front panel assembly

- 1) Remove the top cover.
- 2) Bend three upper hooks of the front panel assembly upward in order to disengage them from their chassis retainers.

- 3) Disengage three lower hooks of the front panel assembly from their chassis retainers in order to remove the front panel assembly from the chassis.

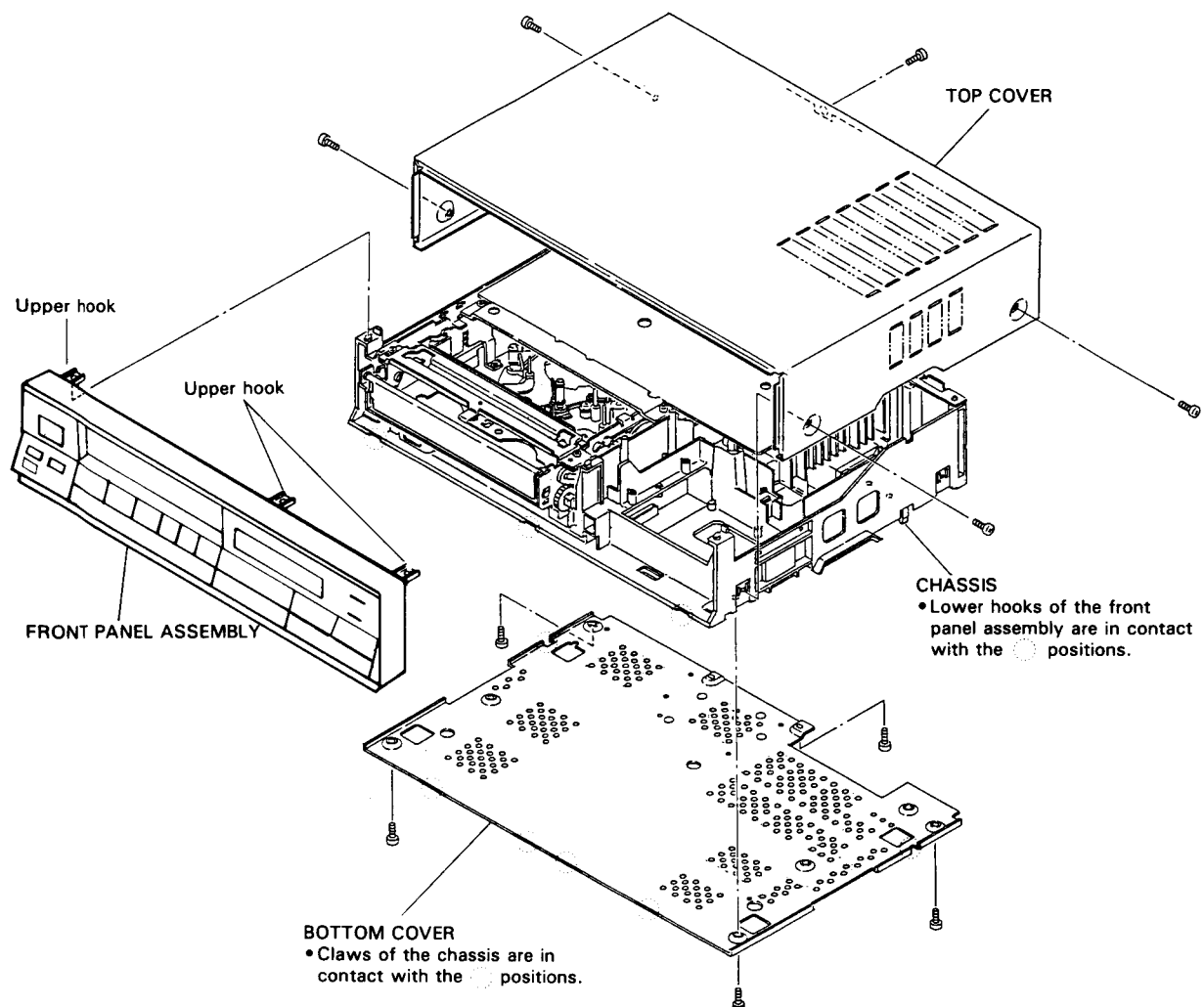


Fig. 1-1-1 Removal of external covers

SECTION 1

MECHANISM ADJUSTMENT

1.1 GENERAL

1.1.1 Precautions

IMPORTANT:

1. Disconnect unit from power before removing or soldering components.
2. When removing a fastener (screw, washer, etc.), be careful not to drop it into the mechanism. If a fastener should be dropped, be sure to retrieve it.
3. The tape transport mechanism has been precisely adjusted at the factory and ordinarily does not require re-adjustment.
4. When removing a part, be very careful not to damage or displace other parts. (Be especially careful with the tape guides and rotary video head drum.)
5. For service procedures that call for operation of the set when the cassette housing is separated from the main-deck, perform as below.
 - 1) Set a sheet of insulated material on the right of the chassis.
 - 2) Remove the cassette housing from the main-deck and place it on the insulated sheet, but do not disconnect the connector from the MAIN PWB.
 - 3) Insert a cassette into the cassette housing. The housing mechanism functions to retract the cassette.
 - 4) Disable the photo transistor sensor (END SENSOR) on the main-deck by applying an opaque cover.
 - 5) The desired modes can be obtained by using the operation switches.

1.1.2 Required test equipment, fixtures and tools

For proper mechanical adjustment, the following test equipment, fixtures and tools are strongly recommended. Without them, a long trial-and-error period would be necessary, resulting in possible damage. In addition, general-purpose tools are required.

1. Test equipment required:

Color television or monitor

Oscilloscope: Wide-band, dual trace, triggered, delayed sweep

Recording tape

Alignment tapes

Signal generator : PAL color bars, staircase

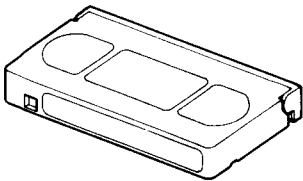
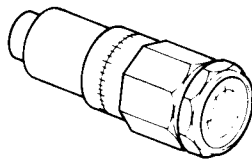
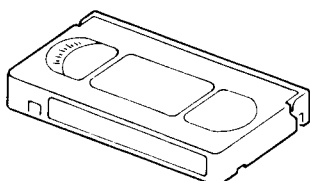
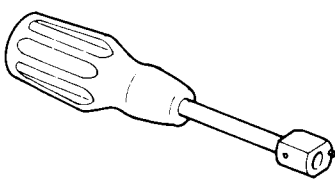
JVC alignment tape MH-2 	Torque gauge assembly PUJ48075-2 (Torquemeter : 600ATG Torquemeterhead : PUJ48016-2) 	Back tension cassette gauge PUJ48076-2 
A/CTL head position tool PUJ47351-2 		

Table 1-1-1 Fixtures and tools

1.1.4 Layout of main parts

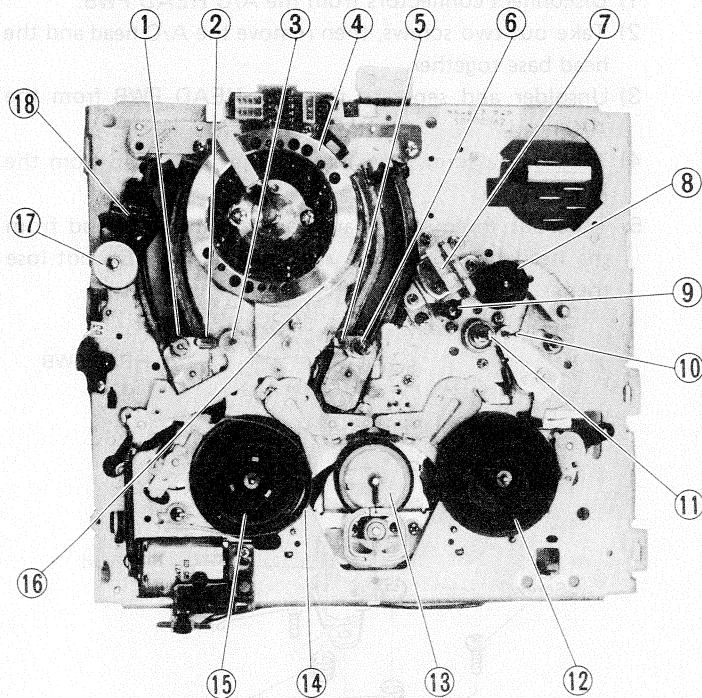


Fig. 1-1-2 Top view of main-deck

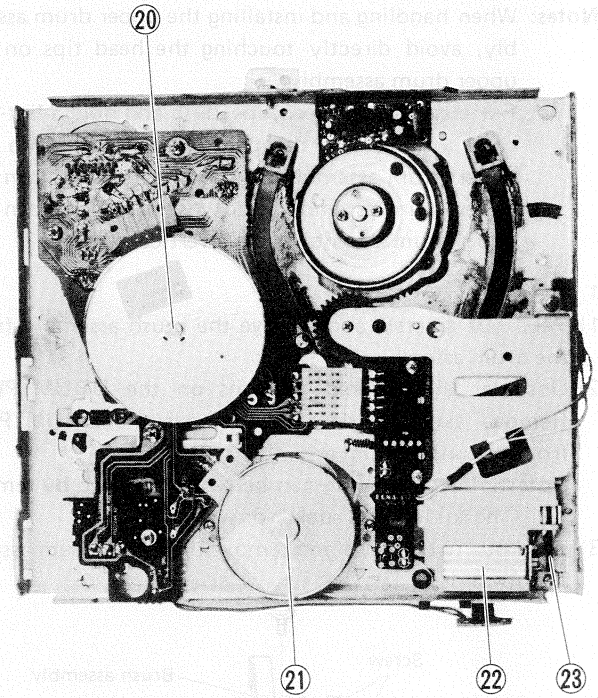


Fig. 1-1-3 Bottom view of main-deck

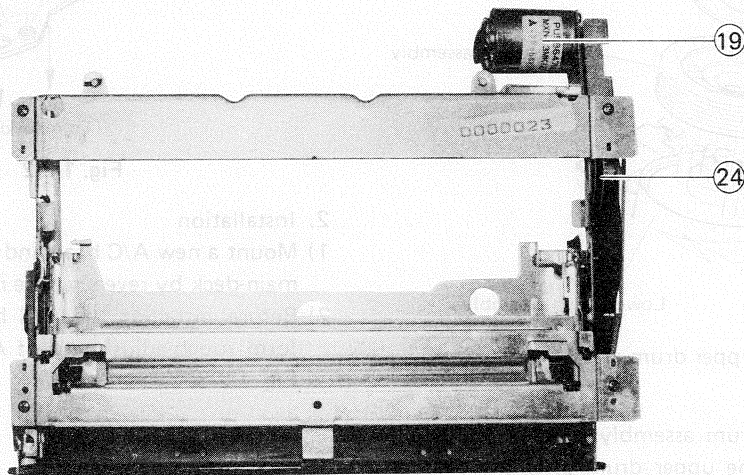


Fig. 1-1-4 Cassette housing

- | | | |
|-------------------------|-----------------------|----------------------|
| 1. Supply guide roller | 9. Take-up guide pole | 17. Impedance roller |
| 2. Supply slant pole | 10. Guide arm | 18. Full erase head |
| 3. Tension pole | 11. Capstan | 19. Cassette motor |
| 4. Upper drum | 12. Take-up reel disk | 20. Capstan motor |
| 5. Take-up slant pole | 13. Reel idler | 21. Reel motor |
| 6. Take-up guide roller | 14. Tension band | 22. Mode motor |
| 7. A/C head | 15. Supply reel disk | 23. Mode belt |
| 8. Pinch roller | 16. Lower drum | 24. Cassette belt |

1.2 MAIN ASSEMBLY REPLACEMENT

1.2.1 Upper drum assembly

Notes: When handling and installing the upper drum assembly, avoid directly touching the head tips on the upper drum assembly.

For cleaning the head tips, push and hold a lint-free cloth or chamois dampened with alcohol to the upper drum assembly by the fingers, then turn the upper drum assembly clockwise. Do not clean the upper drum assembly with a vertical stroke.

1. Removal

- 1) Take out a screw and remove the brush assembly from the drum assembly.
- 2) Unsolder all soldered portions on the DRUM PWB. Remove excess solder, then remove the DRUM PWB from the upper drum assembly.
Note: Soldered portion can be easily removed by removing solder with sucker or wick.
- 3) Take out two screws and remove the upper drum assembly upwards.

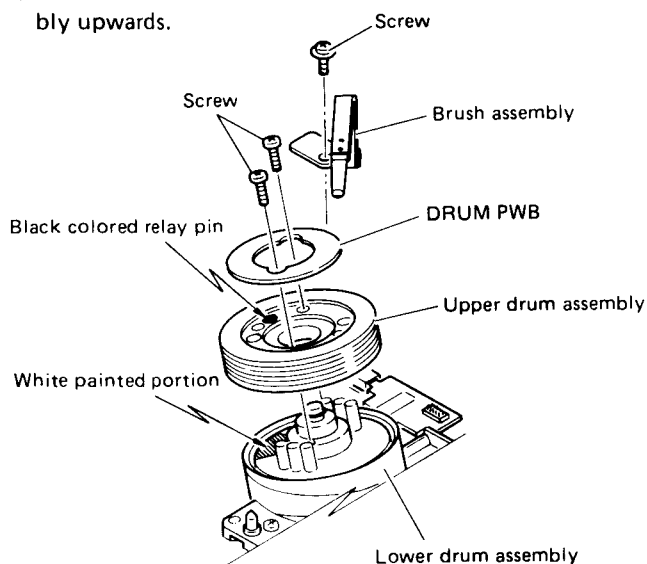


Fig. 1-2-1 Upper drum assembly

2. Installation

- 1) Install a new upper drum assembly so that the black-colored relay pin of the upper drum assembly overlies the white painted portion of the lower drum assembly, as shown in Fig. 1-2-1.
- 2) Tighten two screws in a balanced manner.
- 3) Set the DRUM PWB on the upper drum assembly, then resolder it.
- 4) Clean the drum unit (particularly clean the upper drum assembly).
- 5) Mount the brush assembly on the original position, then tighten a screw to fix the brush assembly.

3. Confirmation and adjustment

- 1) Perform the interchangeability confirmation. Refer to section 1.6.
- 2) Perform the PB switching point adjustment of the Servo (MAIN PWB) circuit. Refer to section 2.2.1.

1.2.2 A/C head (Audio/control head)

1. Removal

- 1) Disconnect connectors from the A/C HEAD PWB.
- 2) Take out two screws, then remove the A/C head and the head base together.
- 3) Unsolder and separate the A/C HEAD PWB from the A/C head.
- 4) Take out a screw and remove the shield cap from the A/C head.
- 5) Take out three screws and separate the A/C head from the head base. Use care regarding springs. Do not lose them.

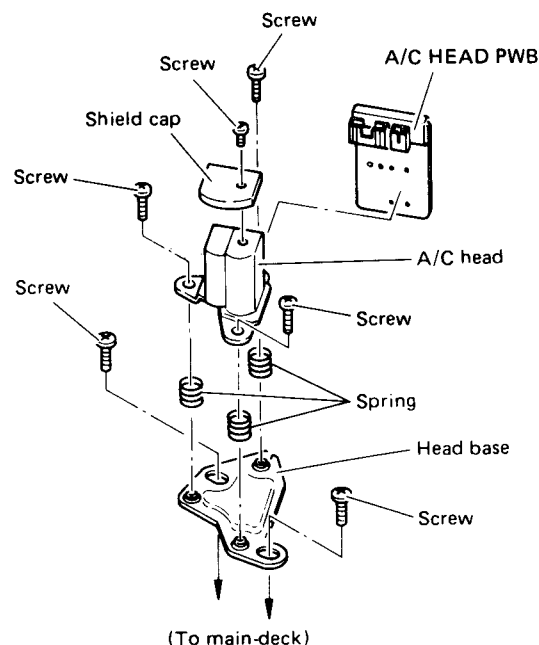


Fig. 1-2-2 A/C head

2. Installation

- 1) Mount a new A/C head and other peripheral parts on the main-deck by reversing the removal procedure.
- 2) Before installing the A/C head on the main-deck, perform rough-adjustment of A/C head height as shown in Fig. 1-2-3.

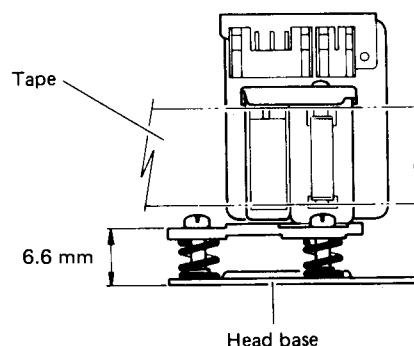


Fig. 1-2-3 A/C head height

3. Confirmation and adjustment

- 1) Use a recording tape and confirm correct tape transport operation, then perform interchangeability adjustment. Refer to sections 1.5 and 1.6.
- 2) Perform overall confirmation of the Audio circuit. Refer to section 2.4.

1.2.3 Tension band assembly

1. Removal

- 1) Take out a screw, then pry the A portion of the tension band assembly upwards to separate it from the tension arm assembly.

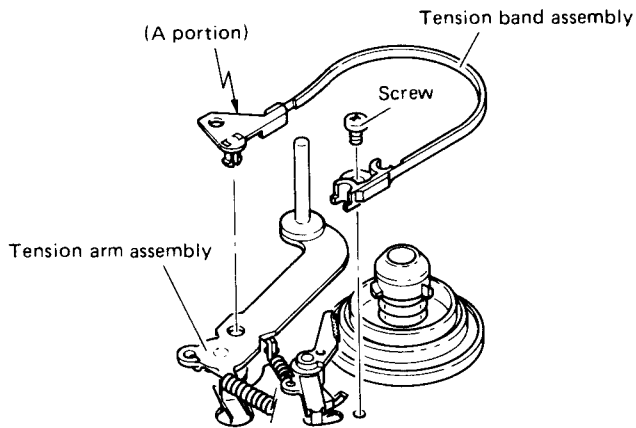


Fig. 1-2-4 Tension band assembly

2. Installation

- 1) Install a new tension band assembly by reversing the removal procedure.

3. Confirmation and adjustment

- 1) Perform tension pole position adjustment. Refer to section 1.4.1.

1.3 ASSEMBLY PROCEDURE OF MECHANISM

The mechanism of this model is mostly engaged to the mechanism control circuit, through the mode select switch. Therefore, the relation between the mode select switch and the control arm decides all mechanical movement of the mechanical parts such as levers, gears, rollers and so on. If these parts are not properly positioned, the unit will be unloaded or compulsorily stopped. This will result in damage of mechanical or electrical parts.

1.3.1 Loading arm assembly

Loading arm assembly consists of loading gear, torsion spring and loading arm.

1. Set up the loading arm assembly correctly as shown in Fig. 1-3-1.

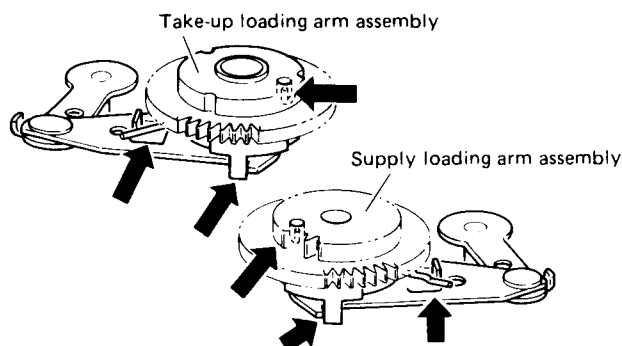


Fig. 1-3-1 Loading arm assembly (1)

2. Install the take-up loading arm assembly and the supply loading arm assembly so that the holes on the loading gears face each other, as shown in Fig. 1-3-2. Do not move the loading arm assemblies from this position for the next step.

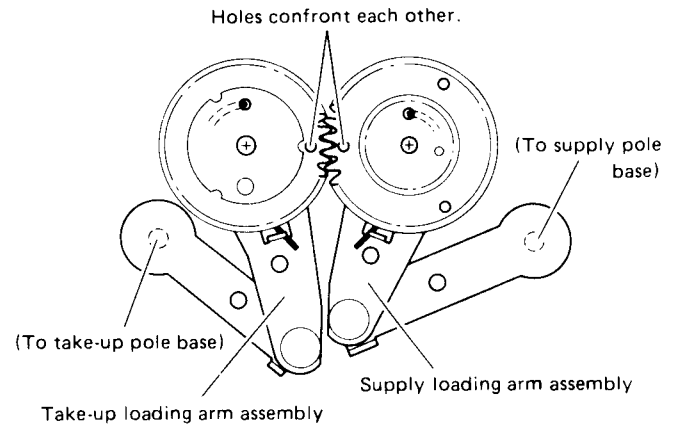


Fig. 1-3-2 Loading arm assembly (2)

1.3.2 Control cam

1. Set the arm gear assembly on the cam bracket assembly so that the hole of the arm gear assembly overlaps the hole of the cam bracket assembly.
2. Install the control cam on the cam bracket assembly so that the hole of the control cam overlaps the hole which is indicated in the step 1), as shown in Fig. 1-3-3. Do not turn the control cam from this position for the next step.

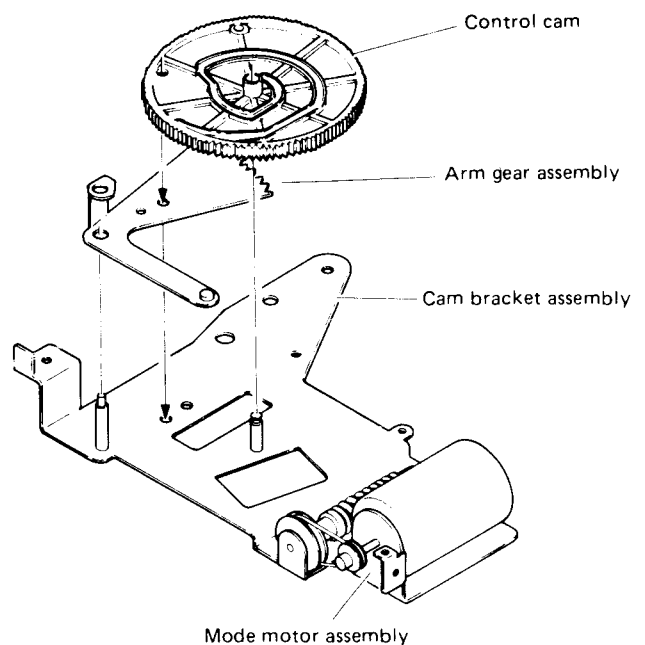


Fig. 1-3-3 Control cam

1.3.3 Cam bracket assembly

1. Push and hold the plate assembly so that the hole of the plate assembly overlaps the hole of the main-deck, as shown in Fig. 1-3-4.
2. Then mount the cam bracket assembly.

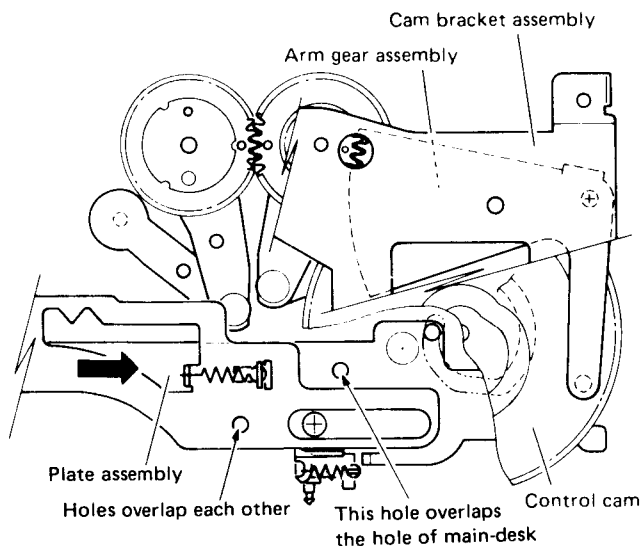


Fig. 1-3-4 Cam bracket assembly

Note: In order to overlap the holes turn the control cam fully counter clockwise by turning the mode motor with a finger.

1.3.4 Mode select switch

1. When the hole of the plate assembly overlaps the hole of main-deck, refer to Fig.1-3-4, confirm that the V-cut of the slider section just overlaps the V-cut of the outer section of the mode select switch.
2. If a difference of more than 0.5 mm is noticed, adjust the mode select switch to the correct position, after unsoldering and loosening the screw.

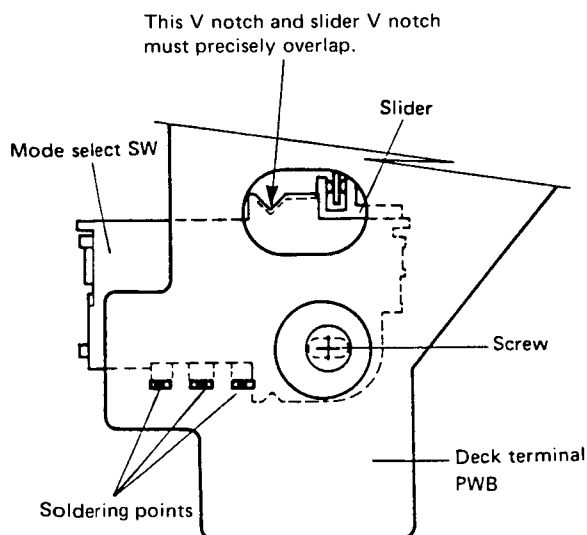


Fig. 1-3-5 Mode select switch

1.4 CONFIRMATION AND ADJUSTMENT

1.4.1 Tension pole position adjustment

1. Without loading a tape, set for the Play mode.
2. Loosen screw a little bit, then adjust the tension band holder so that the distance, shown in Fig. 1-4-1, becomes zero (0 mm).
3. Tighten screw to fix the tension band holder.

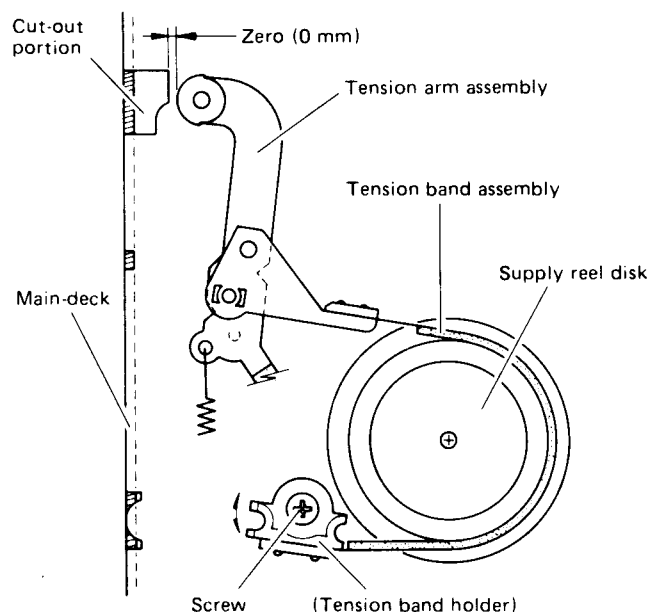


Fig. 1-4-1 Tension pole position

Note: By this adjustment, back tension is within normal specification, in spite of parts tolerances.

4. Use the back tension cassette gauge and set for the Play mode.
5. Confirm that the indication is between 25 – 75.

1.4.2 Take-up torque confirmation

1. Set the Play mode without the cassette housing assembly.
2. Set the torque gauge on the take-up reel disk.
3. The torque gauge consists of upper and lower sections connected by a spring mechanism. Relax the grip on the torque gauge so that the indicator needle and scale rotate at equal speed, then read the indication. The correct value is between 45 – 155.
4. If necessary, replace the take-up and supply clutches.

1.5 TAPE TRANSPORT SYSTEM CONFIRMATION AND ADJUSTMENT

Once adjusted to the complete condition, readjustment of the tape transport system is not necessary, except when the parts that compose the tape transport system are replaced due to troubles by long usage or unexpected accidents.

1.5.1 Tape transport system adjustment

1. Guide roller

To get the FM envelope into ideal shape for interchangeability, the height adjustment of the guide roller is needed.

Before turning the guide roller, slightly loosen the set-screw located under the guide roller. For loosening the setscrew, use the hex key (1.25 mm).

Note: Loosen the setscrew enough to allow the guide roller to be turned. If excessively loose, tape motion may turn the guide roller inadvertently.

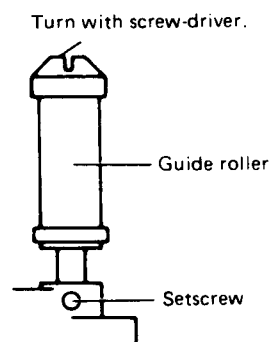


Fig. 1-5-1 Guide roller

2. Impedance roller

Normally, do not adjust the height of the impedance roller. Only when the defects of tape travel are noted at the impedance roller, after complete adjustment for interchangeability, adjust the height of impedance roller to obtain smooth tape travel. For adjustment of impedance roller height, use the nut-driver (5.5 mm).

Note: Do not lower the impedance roller excessively to avoid the defects of tape travel. Tape must be along the lower flange located under the impedance roller.

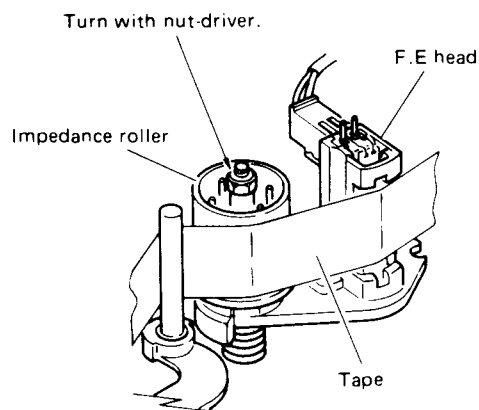


Fig. 1-5-2 Impedance roller

3. A/C head (audio/control head)

When defects of tape travel are noted at the take-up guide pole, adjust the inclination of A/C head to obtain smooth tape travel.

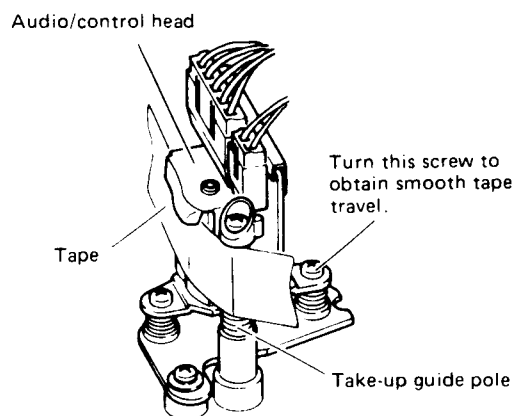


Fig. 1-5-3 A/C head

1.6 INTERCHANGEABILITY CONFIRMATION AND ADJUSTMENT

Before using an alignment tape, use a recording tape and confirm correct tape transport operation.

For the FM envelope output, connect an oscilloscope to TP106 of the MAIN PWB. For audio output, connect to the AUDIO OUT terminal, and trigger the oscilloscope externally with the signal from TP411 of the MAIN PWB. Use only the stairstep segment of the alignment tape, do not use another segment for interchangeability.

1.6.1 FM envelope confirmation and adjustment

1. Push the TRACKING +/- buttons to obtain the maximum FM envelope output corresponding to (a) level in Fig. 1-6-1. Observe the FM envelope, read the maximum level (a) and the minimum levels (b), (c) and (d).

Confirm that:

$$\frac{b}{a} \geq 0.7, \frac{c}{a} \geq 0.5 \text{ and } \frac{d}{a} \geq 0.5$$

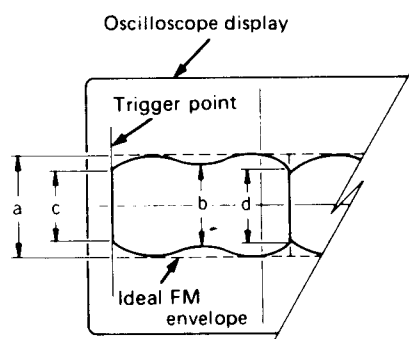


Fig. 1-6-1 FM envelope

2. If defects are noted, following adjustments are required.

- 1) Observe the oscilloscope display and push the TRACKING +/- buttons to vary the FM output from maximum to minimum.
- 2) If the variation is not parallel at the rising portion (drum entrance) of the FM envelope, turn the supply guide roller so that the rising portion of the envelope becomes nearly flat, as shown in Fig. 1-6-2.

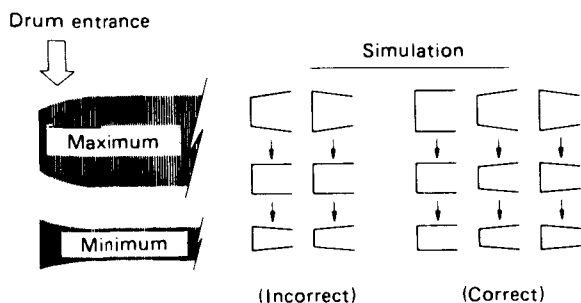


Fig. 1-6-2 Drum entrance

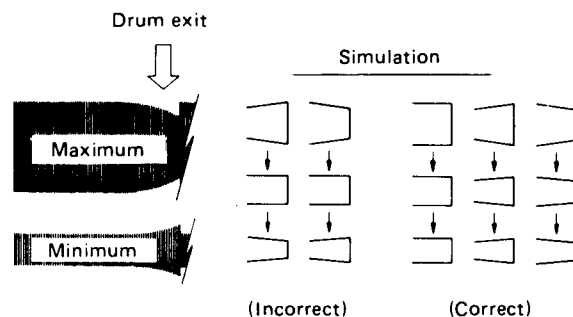


Fig. 1-6-3 Drum exit

- 3) In the same manner as for the rising portion, turn the take-up guide roller to adjust the falling portion (drum exit) of the FM envelope. See Fig. 1-6-3.
- 4) In addition to observing the envelope, confirm absence of tape curling or wrinkling at the impedance roller and take-up guide pole. If it occurs at the impedance roller, adjust the impedance roller height. If it occurs at the take-up guide pole, adjust the A/C head inclination.
- 5) Vary the FM envelope output level and perform fine adjustments of the guide rollers.

1.6.2 A/C head height and azimuth adjustments

Incorrect A/C head height can impair audio signal-to-noise ratio when playing back a pre-recorded tape.

1. For A/C head inclination, adjust screw (A) so that small tape wrinkles are not produced at the take-up guide pole. Turn screw (A) clockwise so that the tape wrinkles are apparent with the lower flange of the take-up guide pole, then turn screw (A) counter-clockwise so that the wrinkles smooth out.
2. Adjust azimuth with screw (B). Turn screw (B) to obtain maximum audio output.
3. For A/C head height, turn screws (A), (B) and (C) in succession by small and equal increments at a time and adjust for maximum audio output level.

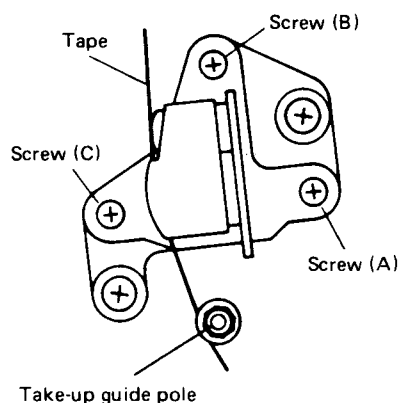


Fig. 1-6-4 A/C head

1.6.3 Control head phase adjustment

1. Set Tracking to Pre-Set Position by pushing both + button and – button at the same time.
2. Loosen screws (D) and (E) a little bit, then cover screw (D) with the A/CTL head position tool and set the pin of the tool into the hole next to screw (D).
3. Turn the tool counter-clockwise to shift the A/C head fully in the direction of the capstan, and then gradually turn the tool clockwise and observe the FM envelope output.
4. Set the A/C head at the point of the first output peak.

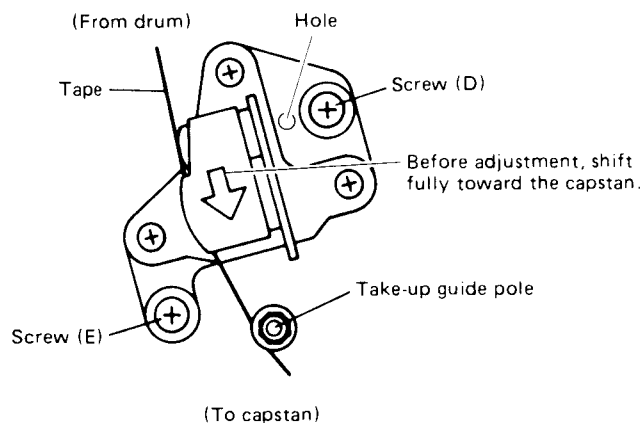


Fig. 1-6-5 Control head phase

1.6.4 Setscrew tightening

1. After confirming absence of tape wrinkling and other transport irregularities, tighten the setscrews located under the guide rollers while in the Stop mode.
Note: Since the guide rollers are easily moved, use care when tightening.
2. Again perform the FM envelope confirmation.

1.6.5 Final confirmation

1. Supply a video signal and perform recording, then play back.
Confirm that the FM envelope satisfies the specifications during playback of alignment tape MH-2.
2. Perform the PB switching point adjustment of the Servo circuit. Refer to section 2.2.1.
3. Perform the audio PB level adjustment of the Audio circuit. Refer to section 2.4.2.
4. Perform overall confirmation of the Video circuit. Refer to section 2.3.

SECTION 2 ELECTRICAL ADJUSTMENTS

2.1 PREPARATION

Electrical adjustments are required after replacing circuit components and certain mechanical parts.

It is important to perform these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.

2.1.1 Required test equipment

1. Colour television or monitor
2. Oscilloscope: wide-band, dual-trace, triggered delayed sweep
3. Frequency counter
4. Audio oscillator
5. Audio voltmeter
6. Digital voltmeter
7. Signal generator: RF/IF sweep/marker
8. Signal generator: PAL colour bar, staircase
9. Recording tape
10. Alignment tape: (MH-2)

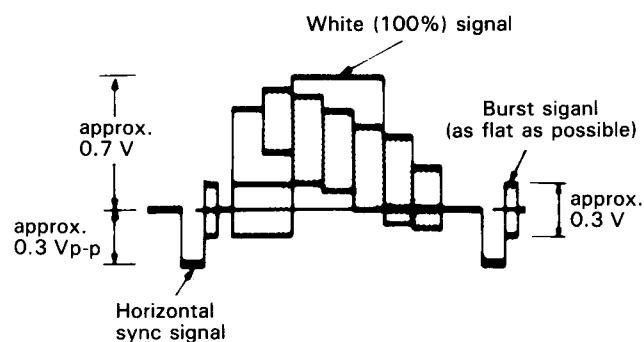


Fig. 2-1-1 Colour bar signal of pattern generator

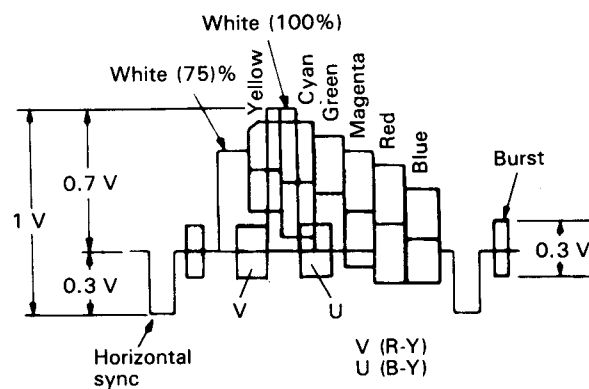


Fig. 2-1-2 Colour bar signal waveform

White	Yellow	Cyan	Green	Magenta	Red	Blue
(75%)						
V	U	White 100%		Black		

Fig. 2-1-3 Colour bar pattern

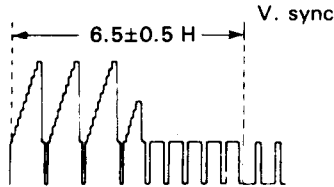
2.1.2 Check and adjustment steps

The check and adjustment steps are provided in the following in the form of charts. For clarity, the nomenclature used in the charts is outlined below.

No.	Checks and adjustments are numbered in the recommended sequence in which they are to be performed.
Item	Name assigned to the particular check and adjustment step.
Check Point	Location to which measuring instrument (oscilloscope unless otherwise noted) is to be connected.
Adjustment Parts	Variable component (resistor, capacitor, etc.) to be adjusted in this step. Dash (—) indicates check only.
Signal & Mode	• Input signal required to perform adjustment. Dash (—) indicates that special signal is not required. • Equipment operating mode at time of check or adjustment.
• Colour bar	Colour bar signal as video input.
• Stairstep	Stairstep signal as video input.
• 1 kHz	Supply a 1 kHz sinewave as audio input signal.
• MH-2 Colour bar	Play colour bar segment of MH-2 alignment tape.
• MH-2 Stairstep	Play stairstep segment of MH-2 alignment tape.
• MH-2 1 kHz	Play 1 kHz audio signal segment of MH-2 alignment tape.
• MH-2 RF sweep	Play RF sweep segment of MH-2 alignment tape.
• E-E	Power on and machine in Stop mode.
• REC	Recording mode
• PB	Playback mode
• REC then (another mode)	Use blank tape, record, then play back in the mode specified.
• SEARCH	Search (FWDS and REVS) playback mode.
• SLOW	Slow motion playback mode.
• STILL	Play back then Pause.
• A DUB	Audio dubbing mode.
Description	This column provides an explanation of the step, notes, adjustment values.

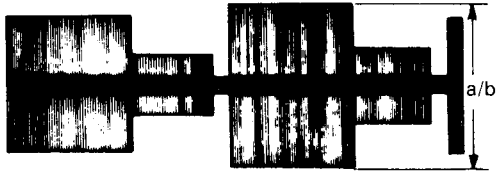
2.2 SERVO CIRCUIT

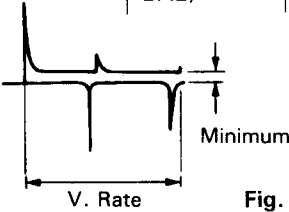
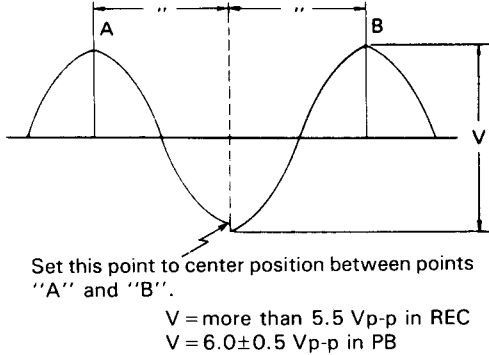
Note: Unless otherwise specified, all test points and adjustment parts are located on the MAIN board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	PB Switching Point	TP110 (VIDEO OUT)	R430 (PB SW POINT)	• PB • MH-2 Stairstep • Trigger slope (—)	1. Connect an oscilloscope to TP110. 2. Play back the stairstep segment of MH-2 alignment tape. 3. Trigger the oscilloscope externally (— slope) with the signal from TP411 (DRUM FF). 4. Adjust R430 to position the trigger point 6.5 ± 0.5 H from V. sync.  Fig. 2-2-1
Note: Before this adjustment "Control head phase adjustment" must be completed. Refer to Section 1.6.3.					
2	V. Pulse Position	MONITOR	R434 (V-LOCK)	• REC then STILL • Colour bar	1. Record a colour bar signal, then play back. 2. In the Still mode, observe the monitor and adjust R434 (rear panel) for the minimum vertical jitter.
3	SLOW Tracking	MONITOR	FINE SLOW board R25 (SLOW TRACK)	• REC then SLOW • Colour bar	1. Record a colour bar signal, then play back. 2. In the Slow mode, observe the monitor and adjust R25 to obtain the fine picture.

2.3 VIDEO CIRCUIT

Note: Unless otherwise specified, all test points and adjustment parts are located on the MAIN board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	VXO	TP209 (VXO)	R207 (VXO)	• PB • MH-2 Colour bar	1. Connect a frequency counter to TP209. 2. Play back the colour bar segment of MH-2 alignment tape. 3. Adjust R207 for $4.433619 \text{ MHz} \pm 50 \text{ Hz}$.
2	REC Color Level	TP207 (PB COL)	R214 (REC COL LEV)	• Colour bar • REC then PB	1. Play back the colour bar signal of the MH-2 Alignment tape. 2. Connect an oscilloscope to TP207 and measure the colour play-back level. Make a note of this as level "a". (Tracking control: maximum level) 3. Use a spare tape to record and play back a colour bar signal. Make a note of this play-back level as level "b". (Tracking control: reset) 4. So that the ratio of b/a becomes 0.85 ± 0.05, adjust R214 during recording. 5. Confirm that the channel difference is within $\pm 3 \text{ dB}$.  Fig. 2-3-1

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
3	Noise cancel balance	TP121 (NC BAL)	R112 (YNR NC BAL)	• Colour bar • REC then PB	1. Record, then play back a colour bar signal and connect an oscilloscope to TP121. 2. As indicated in the figure, adjust R112 for minimum DC step difference.
		 Fig. 2-3-2			
4	SECAM DET	TP251 (S DET ADJ)	L251 (1/2 fH TUNING)	• SECAM colour bar • E-E	1. Connect an oscilloscope to TP251. 2. Adjust L251 so that the transition step becomes centered between "A" and "B" as shown in Fig. 2-3-3.
		 Fig. 2-3-3			3. Connect an oscilloscope to TP214. 4. Record, then play back a SECAM colour bar signal. 5. Adjust R257 for 6.0 ± 0.5 Vp-p.
5	PB Frequency Response	MONITOR	R127 (PB FREQ RESPONSE)	• REC then PB • TV Broadcast	1. Record, then play back a colour broadcast that shows a good depiction of human facial contours. 2. Adjust R127 to obtain distinct facial features on the monitor.

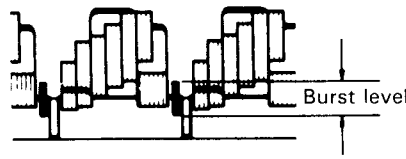
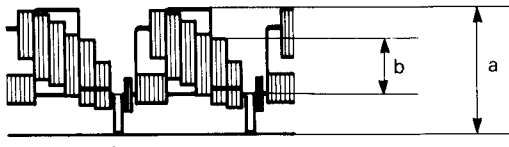
2.4 AUDIO CIRCUIT

Note: Unless otherwise specified, all test points and adjustment parts are located on the MAIN board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	Audio Bias Level	TP31, TP32 (BIAS LEVEL)	R41 (BIAS ADJ)	• REC	1. Connect a digital voltmeter between TP31 and TP32. 2. Set for REC mode without a signal. 3. Adjust R41 for $3.5 \text{ mV} \pm 0.2 \text{ mVrms}$.
2	Audio PB Level	AUDIO OUT	R33 (PB LEVEL)	• REC then PB	1. Connect an oscilloscope to AUDIO OUT. 2. Supply an audio signal (-8 dBs/1 kHz) to AUDIO IN and record together with a VIDEO signal, then play back. 3. Adjust R5 so that the audio output level during playback becomes $-6 \pm 1.0 \text{ dBs}$.

2.5 TUNER/IF CIRCUIT

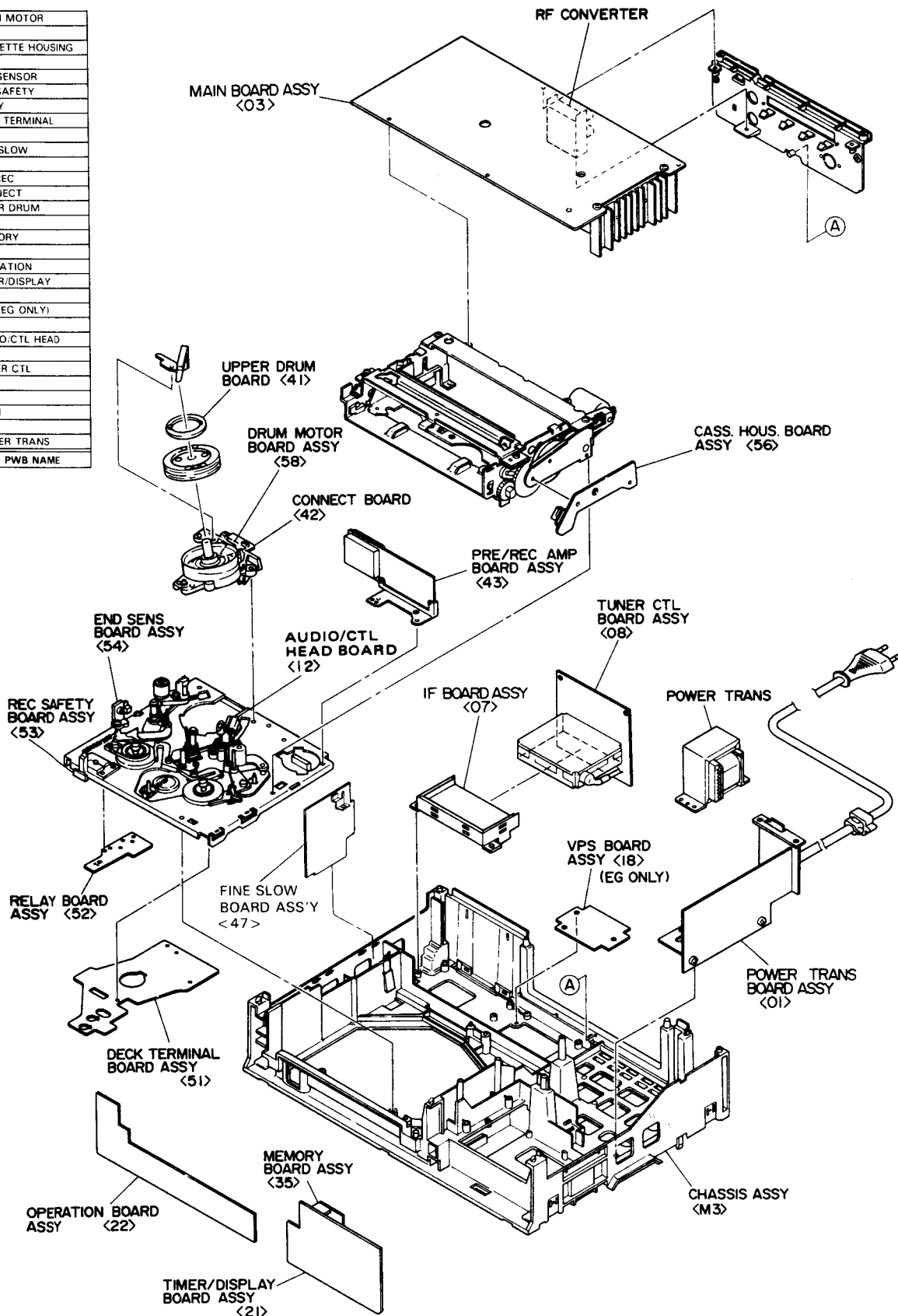
Note: Unless otherwise specified, all test points and adjustment parts are located on the IF board.

No.	Item	Check Point	Adjustment Parts	Signal & Mode	Description
1	VCO	MONITOR	T1 (LLD)	- TV broadcast - Tuner mode	1. Receive a colour broadcast. 2. Adjust T1 to obtain a fine picture on the monitor.
2	AFC	MAIN board TP110 (VIDEO OUT)	T2 (AFC)	- TV broadcast - Tuner mode	1. Receive a colour broadcast. 2. With AFC SW to OFF, perform fine tuning. Then, precisely read the burst level of IC1-18. Make a note of the burst level. 3. When AFC SW is ON, adjust T2 (AFC) so that the burst level of IC1-18 becomes equal to the noted level as shown in Fig. 2-5-1.  Fig. 2-5-1
3	Color Level	MAIN board TP110 (VIDEO OUT)	R43 (COL LEV)	- TV broadcast - Tuner mode	1. Supply a colour bar signal from a TV channel signal generator and select the channel corresponding to the generator. 2. With AFC SW ON, adjust R43 to produce signal waveform as shown in Fig. 2-5-2. Alternate method 1. Receive a colour broadcast. 2. With AFC SW ON, adjust R43 so that the burst level becomes 2/3 of the sync level.  Fig. 2-5-2
4	RF AGC	MONITOR	R18 (AGC)	- TV broadcast - Tuner mode	Note: Adjust R18 (RF AGC) to correct for excess noise in the picture or when streaky cross interference occurs due to strong electrical fields. 1. Adjust R18 to minimize noise or steaks on the TV screen. 2. Check for absence of abnormality on all channels.

SECTION 3 CHARTS AND DIAGRAMS

3.1 CIRCUIT BOARD LOCATIONS

58	DRUM MOTOR
56	CASSETTE HOUSING
54	END SENSOR
53	REC SAFETY
52	RELAY
51	DECK TERMINAL
47	FINE SLOW
43	PRE/REC
42	CONNECT
41	UPPER DRUM
35	MEMORY
22	OPERATION
21	TIMER/DISPLAY
18	VPS (EG ONLY)
12	AUDIO/CTL HEAD
08	TUNER CTL
07	IF
03	MAIN
01	POWER TRANS
NO.	PWB NAME



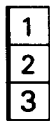
3.2 GENERAL INFORMATIONS

3.2.1 Connections

Note:

Unless otherwise specified, only signal input flow is indicated.

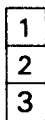
Connection arrows indicate only signal outputs.



: Connector



: Direct connection



: Board in connector



: Connected pattern in the board.



Abbreviations R : Regulator



V : Video M : Mechacon
S : Servo A : Audio

VS : Signal flow from video to servo.

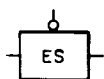
3.2.2 Indications

AUX : Active only at high.

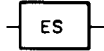
$\overline{\text{AUX}}$: Active only at low.

$\overline{\text{AUX}}$: Active only at middle.

$\overline{\text{AUX}}$: Active only at open.



: Active only at low for electronic switch.



: Active only at high for electronic switch.



: Low pass filter.



: High pass filter.



: Band pass filter.



: Limiter.



: Detector

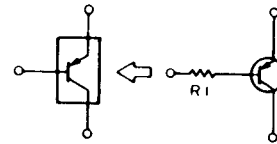
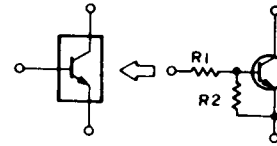


: Amplifier.



: Mixer stage.

3.2.3 Digital transistor



DTA114T
T mark only

Note:

The digital transistor includes built in resistors.

It features small size and high reliability.

Both PNP and NPN types are available.

Uses:

Inverter, Interface, driver circuits.

3.2.4 Signal flow in the schematic



Recording signal path



Playback signal path



REC/PB signal path

3.2.5 Schematic diagram values

Unless otherwise specified.

1. All resistance values are in ohms, 1/6 W, 1/8 W, (refer to parts list).
2. All capacitance values are in μF , (P; PF).
3. All inductance values are in μH , (m; mH).
4. All diodes are 1SS133 or MA165, (refer to parts list).
5. Voltages are DC-measured (reference to ground) with a digital voltmeter during recording (SP mode) and playback (SP mode) with alignment tape. Where voltages differ between recording and playback, the voltage during playback is shown in parentheses.
6. Waveforms (VIDEO System) are measured (reference to ground) with a color bar during recording (SP mode) and playback (SP mode) with alignment tape.
7. Waveforms (AUDIO System) are measured (reference to ground) with 1 kHz (-8 dBs) during recording and playback with alignment tape (1 kHz).
8. Shaded () parts are critical for safety. Replace only with specified parts numbers.

3.3 ABBREVIATIONS USED IN THE SCHEMATIC DIAGRAM

A	AC	: Alternating Current	D	D	: Drum, Digital, Diode, Drain
	ACC	: Automatic Color Control		DAC	: Digital to Analog Converter
	ACCEL	: Acceleration		dB	: Decibel
	A/CTL	: Audio/Control		DC	: Direct Current
	ADC	: Analog to Digital Converter		DEC	: Decoder
	ADD	: Adder		DEM0D	: Demodulator
	ADRS	: Address		DEMUX	: Demultiplexer
	ADJ	: Adjustment		DET	: Detector
	A DUB	: Audio Dubbing		DEV	: Deviation
	AE	: Audio Erase		DIF	: Differential
	AEF	: Automatic Editing Function		DISCR	: Discriminator
	AFC	: Automatic Frequency Control		DL	: Delay Line
	AFT	: Automatic Fine Tuning		DOC	: Dropout Compensator
	AGC	: Automatic Gain Control		DOD	: Drop Out Detector
	AH	: Audio Head		DPC	: Drum Phase Control
	AL	: After Loading			
	ALC	: Automatic Light Compensation	E	E	: Edit, Emitter
		Automatic Level Control		E-E	: Electric to Electric
	AM	: Amplitude Modulation		EF	: Emitter-Follower
	AMP	: Amplifier		EMP	: Emphasis
	ANT	: Antenna		EN	: Enable
	APC	: Automatic Pedestal Control		ENC	: Encoder
		Automatic Phase Control		ENV	: Envelope
	APL	: Average Picture Level		EP	: Extended Play
	A/S/M	: Audio/Servo/Mechacon		EQ	: Equalizer
	ASS'Y	: Assembly		ES	: Electronic Switch
	ATT	: Attenuator		ESNS	: End Sensor
	AUD	: Audio		EXP	: Expander
	AUTO	: Automatic		EXT	: External
	AUX	: Auxiliary			
B	B	: Base	F	F	: Farad, Fuse
	BAL	: Balance		F ADV	: Frame Advance
	BATT	: Battery		FDP	: Fluorescent Display Panel
	BFP	: Burst Flag Pulse		FE	: Full Erase
	BIT	: Binary Digit		FET	: Field Effect Transistor
	BLK	: Black, Blanking		FF	: Fast Forward
	BLU	: Blue			Flipflop
	BILING	: Bilingual		FG	: Frequency Generator
	BPF	: Bandpass Filter		FM	: Frequency Modulation
	BRK	: Brake		FMA	: FM Audio
	BRN	: Brown		FR	: Full Recording, Frame, Fusible Resistor
	BT	: Band Tuning		FREQ	: Frequency
	BUFF	: Buffer		F-V CONV	: Frequency to Voltage Converter
	BW or B/W	: Black and White		FWD	: Forward
				FWD S	: Forward Search
C	C	: Capacitance, Collector, Color	G	G	: Green, Gate, Grid
	CAP	: Capstan, Capacitor		GEN	: Generator
	CAR	: Carrier		GND	: Ground
	CARR	: Carrier		GRN	: Green
	CASS	: Cassette		GRY	: Gray
	CCD	: Charge Coupled Device			
	CCT	: Circuit	H	H	: High, Henry, Hour
	CD	: Count Down		HG	: Hall Generator
	CE	: Chip Enable		HPF	: Highpass Filter
	CF	: Ceramic Filter		Hz	: Herz
	CH	: Channel			
	CHG	: Charge	I	IC	: Integrated Circuit
	CHROMA	: Chrominance		ID	: Identification (Pulse)
	CLK	: Clock		IF	: Intermediate Frequency
	CLR	: Clear		IFR	: Infrared
	CMD	: Command		IFT	: Intermediate Frequency Transformer
	CNT	: Count, Counter		IND	: Indicator
	COL	: Color		INH	: Inhibit
	COM	: Common		INS	: Insert
	COMB	: Combination		INT	: Internal, Interrupt
		Comb Filter		INV	: Inverter
	COMP	: Comparator		I/O	: Input/Output
		Composite		IR	: Infrared
		Compensation			
	CONN	: Connector	L	L	: Low, Left
	CONV	: Converter		LIM	: Limiter
	CP	: Circuit Protector		LIN	: Linearity
		Clamp Pulse		LOAD	: Loading (Cassette)
	CPC	: Capstan Phase Control		LP	: Long Play
	CTL	: Control		LPF	: Lowpass Filter

M	M	: Motor, Mega
	MAX	: Maximum
	MDA	: Motor Drive Amplifier
	MECHACON	: Mechanism Control
	MIC	: Microphone
	MIN	: Minimum
	MIX	: Mixer, Mixing
	MMV	: Monostable Multivibrator
	MOD	: Modulation, Modulator
	MODEM	: Modulator-Demodulator
	MON	: Monitor
	MPX	: Multiplexer, Multiplex
	MS	: Mode Select

N	NAND	: Not-And
	NC	: Not Connected, Normally Closed
	NFB	: Negative Feedback
	NLN	: Non-Linear
	NO	: Normally Open
	NOR	: Normal, Not-Or
	NR	: Noise Reduction

O	OP	: Operation
	OPAMP	: Operational Amplifier
	ORN	: Orange
	OSC	: Oscillator

P	PB	: Playback
	PC	: Photocoupler, Pulse Counter
	PCM	: Pulse Code Modulation
	PG	: Pulse Generator
	PGM	: Program
	PI	: Photo Interrupter
	PIF	: Picture Intermediate Frequency
	PLA	: Programmable Logic Array
	PLL	: Phase Locked Loop
	POS	: Position
	p-p	: Peak-to-Peak
	PREAMP	: Preamplifier
	P/S	: Pause/Still
	PSC	: Pulse Swallowing Control
	PU	: Pickup
	PUT	: Programmable Unijunction Transistor
	PWM	: Pulse Width Modulation
	PWR	: Power

Q	Q	: Quality Factor
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R	R	: Red, Right
	RA	: Resistor Array
	RAE	: Random Access Enable
	RAM	: Random Access Memory
	REC	: Recording
	REF	: Reference
	REG	: Regulated, Regulator
	REM	: Remote
	REMOCON	: Remote Control (Unit)
	REV	: Reverse
	REV S	: Reverse Search
	REW	: Rewind
	R/P	: Record/Playback
	RPT	: Repeat
	RST	: Reset
	RT	: Rotary Transformer
	RUN	: Running
	RY	: Relay

S	SAW	: Sawtooth, Surface Acoustic Wave
	SC	: Subcarrier, Simulcast
	SCH	: Search
	SEL	: Select, Selector
	SENS	: Sensor
	SEP	: Separator
	SF	: Source Follower
	SFF	: Short Fast Forward
	SIF	: Sound Intermediate Frequency

SHARP	: Sharpness
SN	: Signal to Noise Ratio
SOL	: Solenoid
SP	: Standard Play
SREV	: Search Reverse
SREW	: Short Rewind
S/S	: Slow/Still
SSG	: Sync Signal Generator
SSNS	: Start Sensor
STD	: Strobe Data, Standard
SUP	: Supply
SW	: Switch
SWD	: Switched
SYNC	: Synchronization

T	TF	: Thermal Fuse
	TIM	: Timing
	TK	: Tracking
	TNR	: Tuner
	TP	: Test Point
	TPZD	: Trapezoid
	TR	: Transistor, Trimmer
	TRANS	: Transformer
	TU	: Take-up

U	UL	: Unloading
	UNREG	: Unregulated
	UNSW	: Unswitched

V	V	: Vertical, Volt
	VCO	: Voltage Controlled Oscillator
	VD	: Vertical Drive
	VIF	: Video Intermediate Frequency
	VLT	: Violet
	VR	: Variable Resistor
	VS	: Video and Sync
	V/T	: Video/Television
	V/U	: VHF/UHF
	VXO	: Variable Crystal Oscillator

W	W	: Watt
	W & D	: White and Dark
	WHT	: White

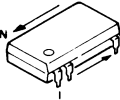
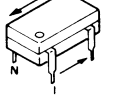
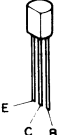
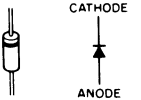
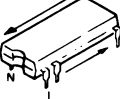
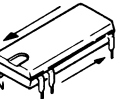
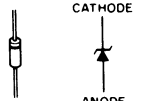
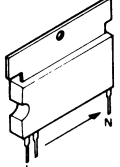
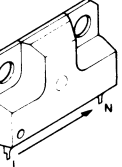
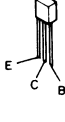
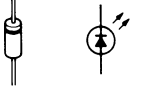
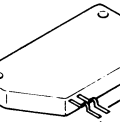
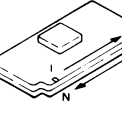
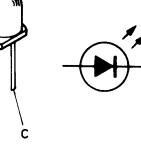
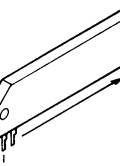
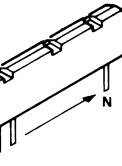
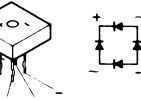
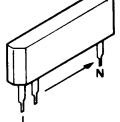
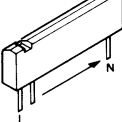
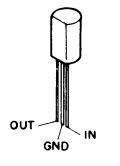
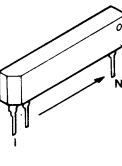
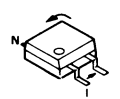
X	XTAL	: Crystal
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Y	Y	: Luminance
	YEL	: Yellow

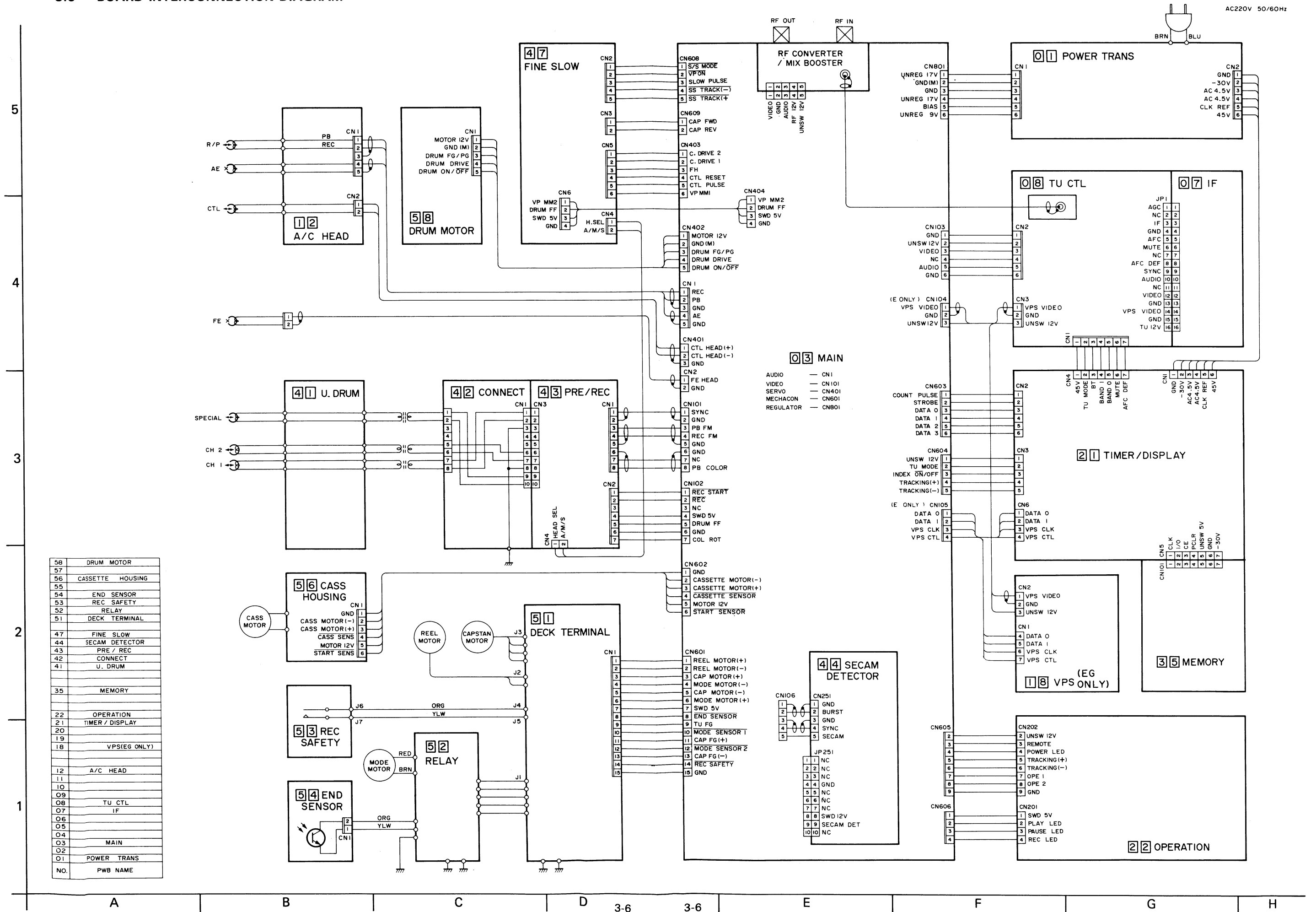
3.4 MAIN TYPES OF ACTIVE AND PACKAGE CIRCUITS

INTEGRATED CIRCUIT			TRANSISTOR			DIODE		
	NAME	L		NAME	L		NAME	L
B	BA10358	2B	D	DTA114ES	3C	H	HZS4.3EB2	2E
	BA6222	3A		DTA124ES	3C		HZS7.5EB2	2E
	BA6259N	5B		DTC124ES	3C		HZT33-02	2E
	BA7007	6B		DTC114YS	3C		HZ30-2	2E
	BA7751ALS	5A		DTC144EF	1D	L	LTZ-MR15	3E
	BU2767S	2B		DTC144ES	3C			
H	HA118019NT	2B	2SA	2SA1309	3C	M	MA165	1E
	HD49703NT	2A		2SA720	2C			
I	IC-PST523H-2	1A	2SB	2SB641	3C			
				2SB810	1D			
L	LA7910	7A	2SC	2SC1740	3C	R	RD10ES-T1B2	2E
				2SC2021	1D			
M	MN1220	2A	2SD	2SC2636	1D	S	SLR-34MC3F	4E
	MSM6967RS	8A		2SC3311	3C			
	M50965-645SP	2B		2SC3327	3C			
	M51496P	2B		2SC3399	3C			
	M5278L05	7A		2SC3401	3C		S4VB10-F2	5E
	M5278L56	7A		2SC536	3C			
P	PB20166C	4B		2SD1450	3C		1SS132	1E
	PU22046A	4B		2SD637	1D			
S	STK5481	4A						
T	TA7374P	6A					1SS133	1E
U	UPD75208CW-097	2A					1SS292	1E
							11E2	1E

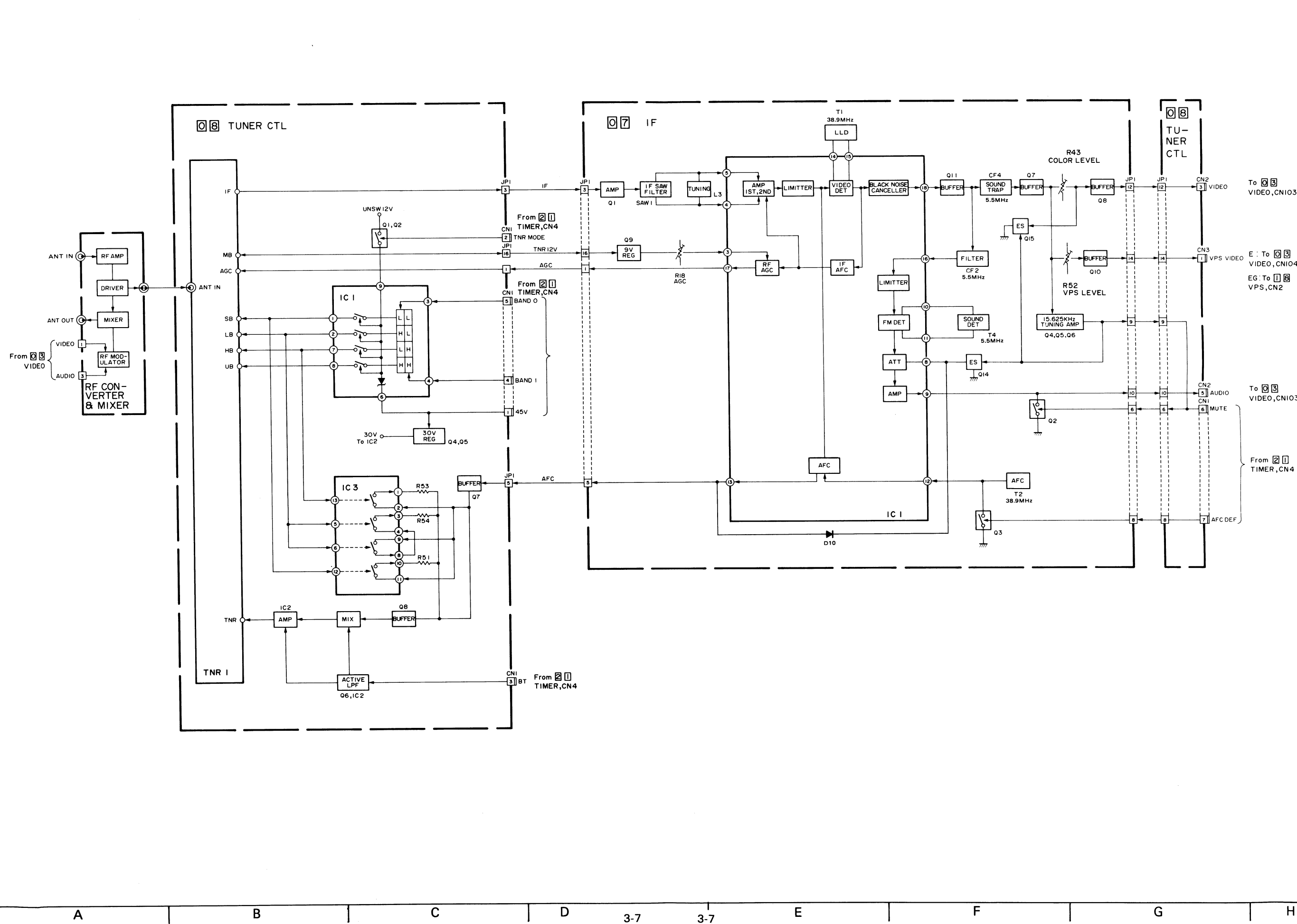
Note: FOR INSTANCE, BA10358 →
2B: SEE COLUMN 2, LINE B

	Integrated Circuit		Transistor		Diode
	A	B	C	D	E
1					
2					
3					
4					
5					
6					
7					
8					
9					

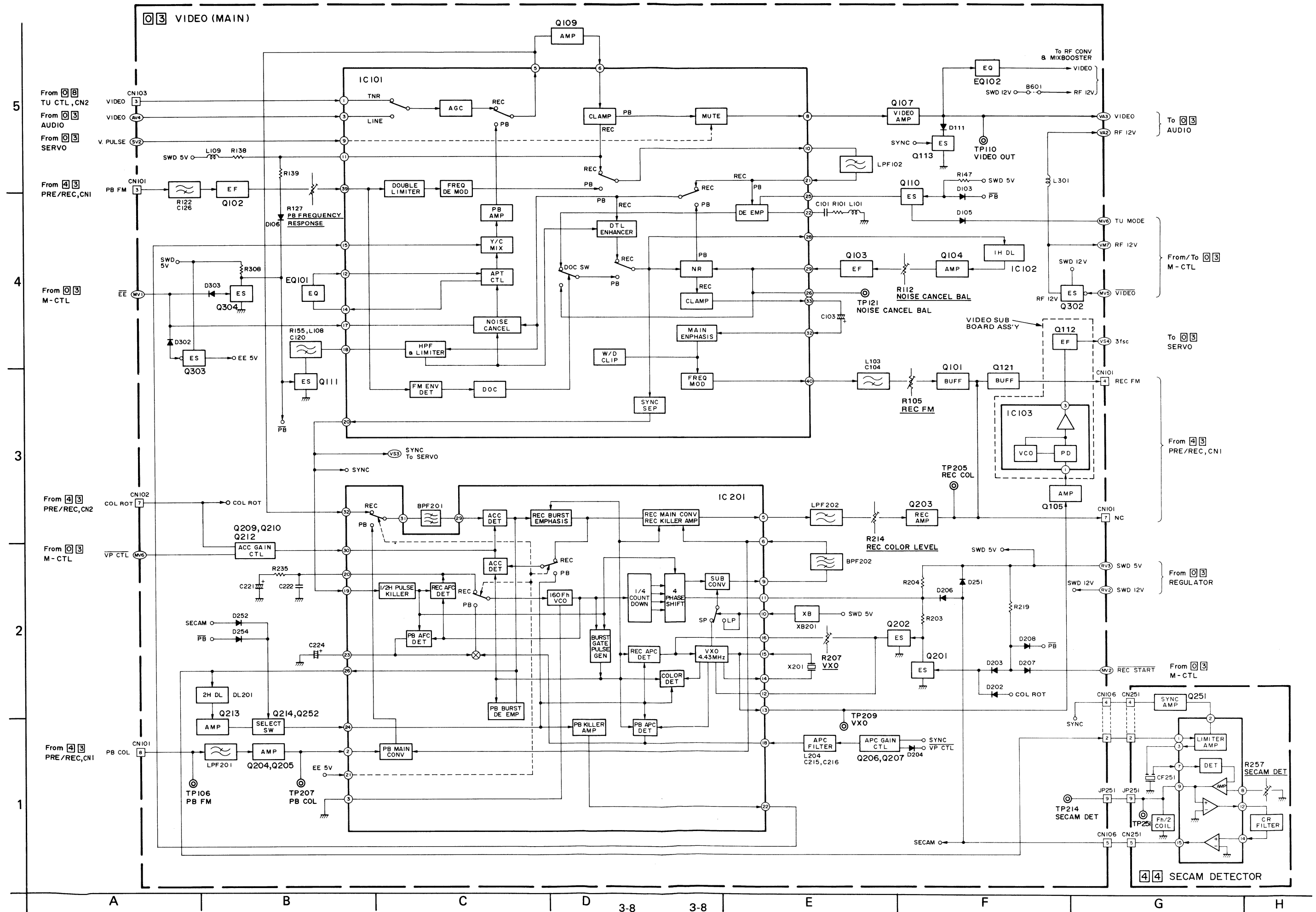
3.5 BOARD INTERCONNECTION DIAGRAM



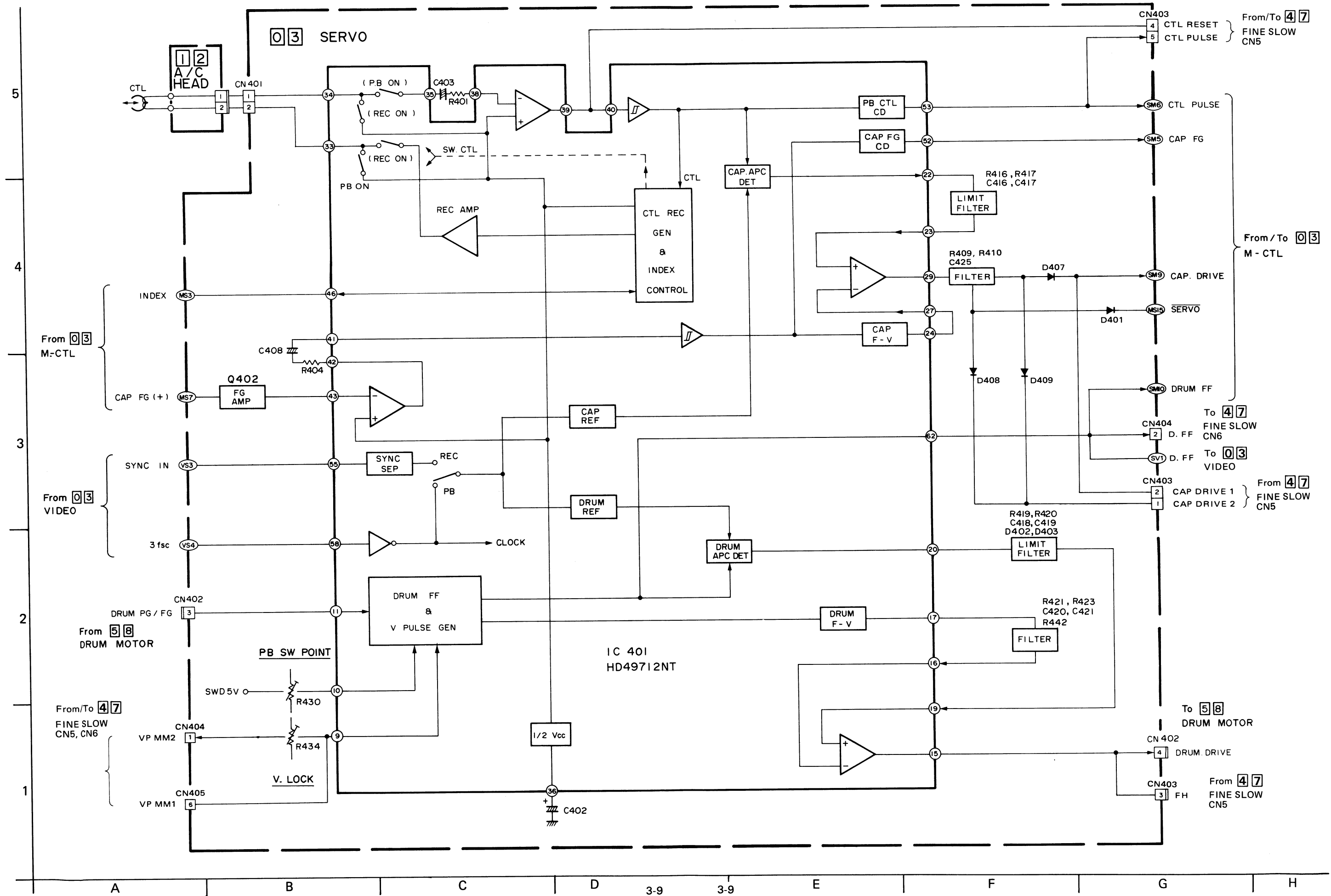
3.6 IF AND TUNER CTL BLOCK DIAGRAMS



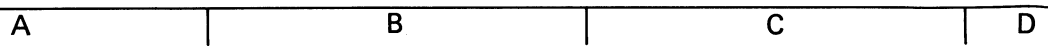
3.7 VIDEO BLOCK DIAGRAM



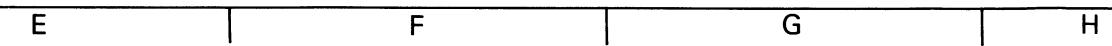
3.8 SERVO BLOCK DIAGRAM



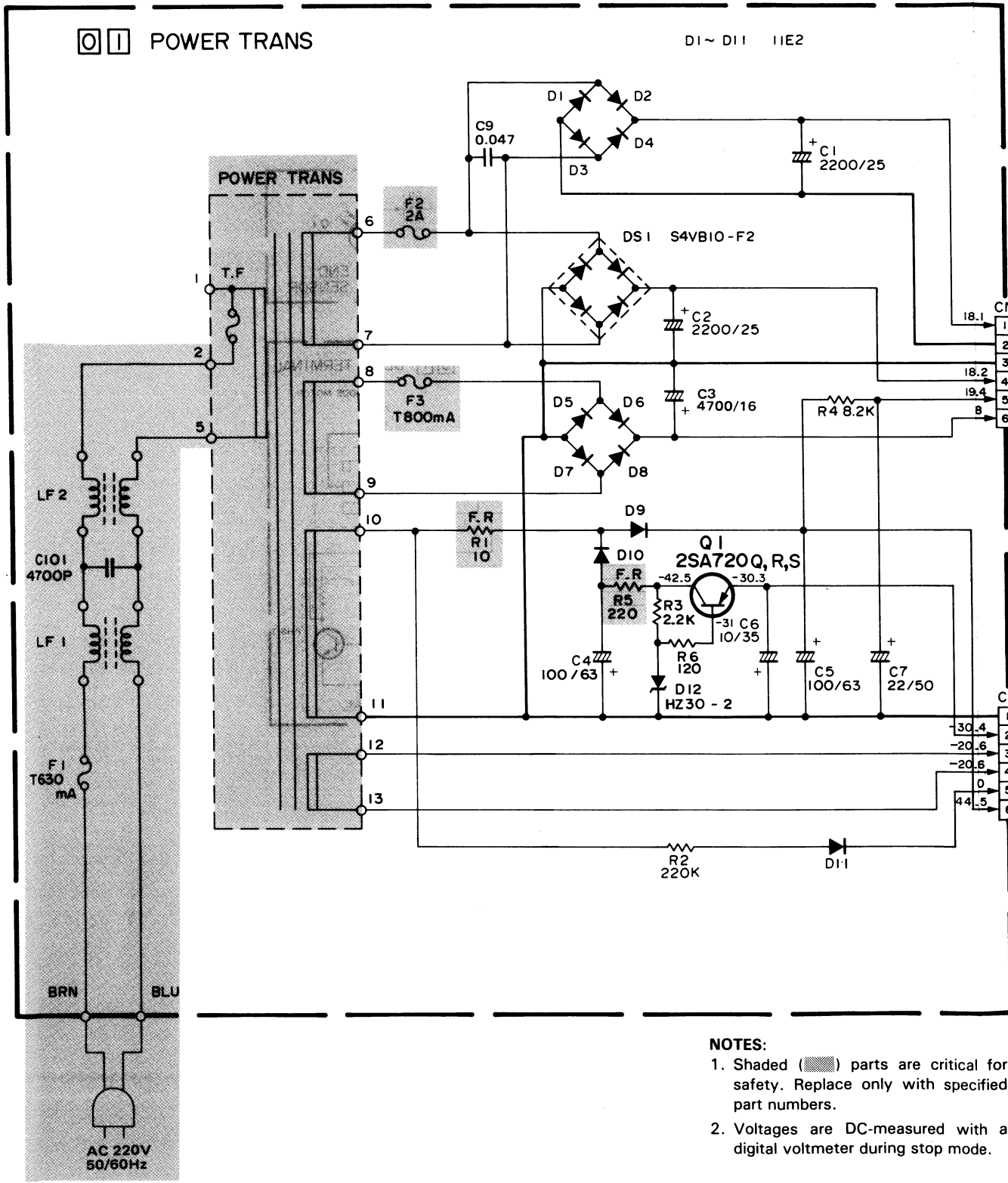
A vertical number line with tick marks labeled 1, 2, 3, 4, and 5 from bottom to top.



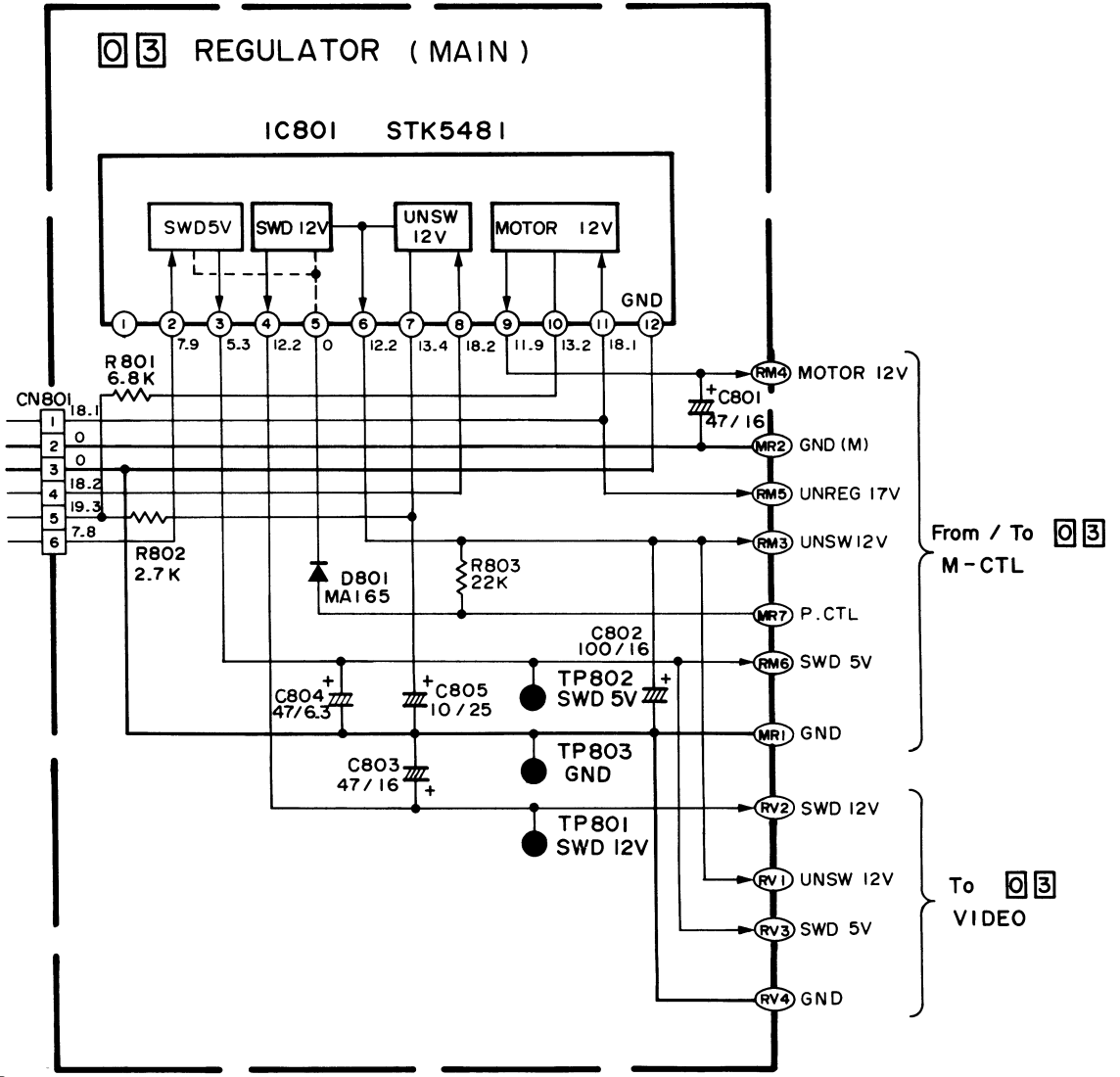
E : From/To 03 VIDEO
EG : From/To 18 VPS



3.11 POWER TRANSFORMER AND REGULATOR SCHEMATIC DIAGRAMS

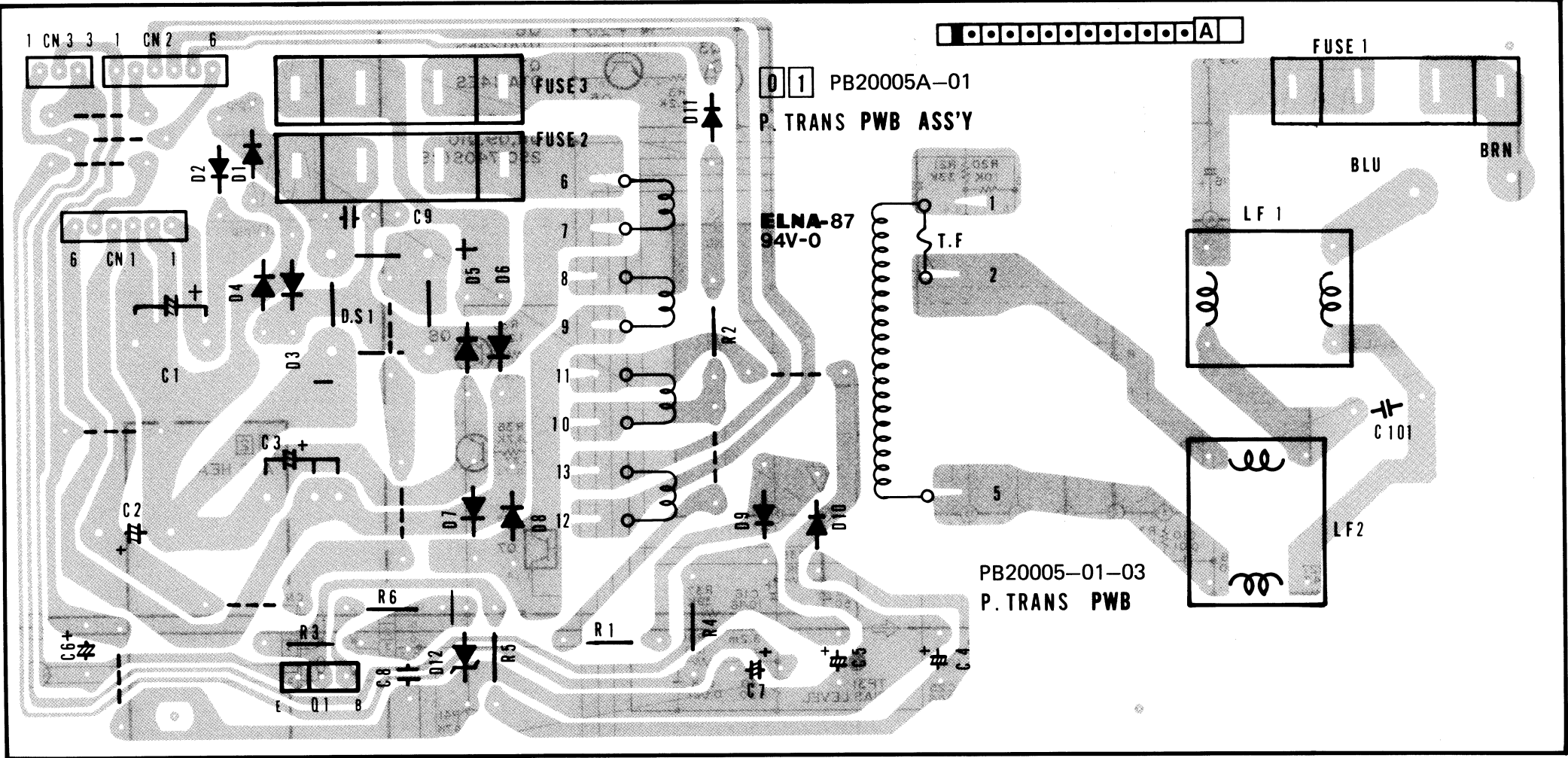


- NOTES:
1. Shaded () parts are critical for safety. Replace only with specified part numbers.
 2. Voltages are DC-measured with a digital voltmeter during stop mode.



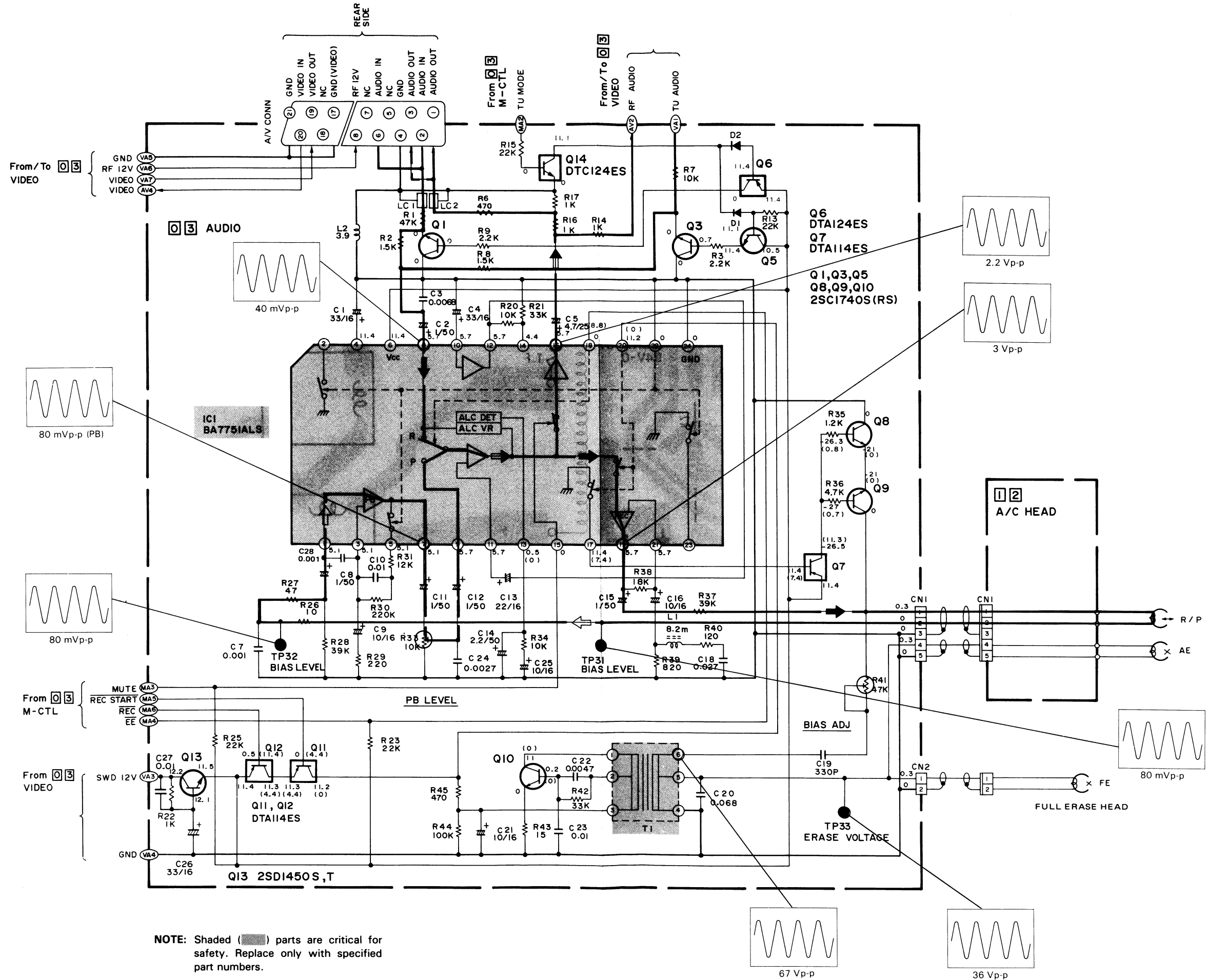
3.12 POWER TRANSFORMER CIRCUIT BOARD

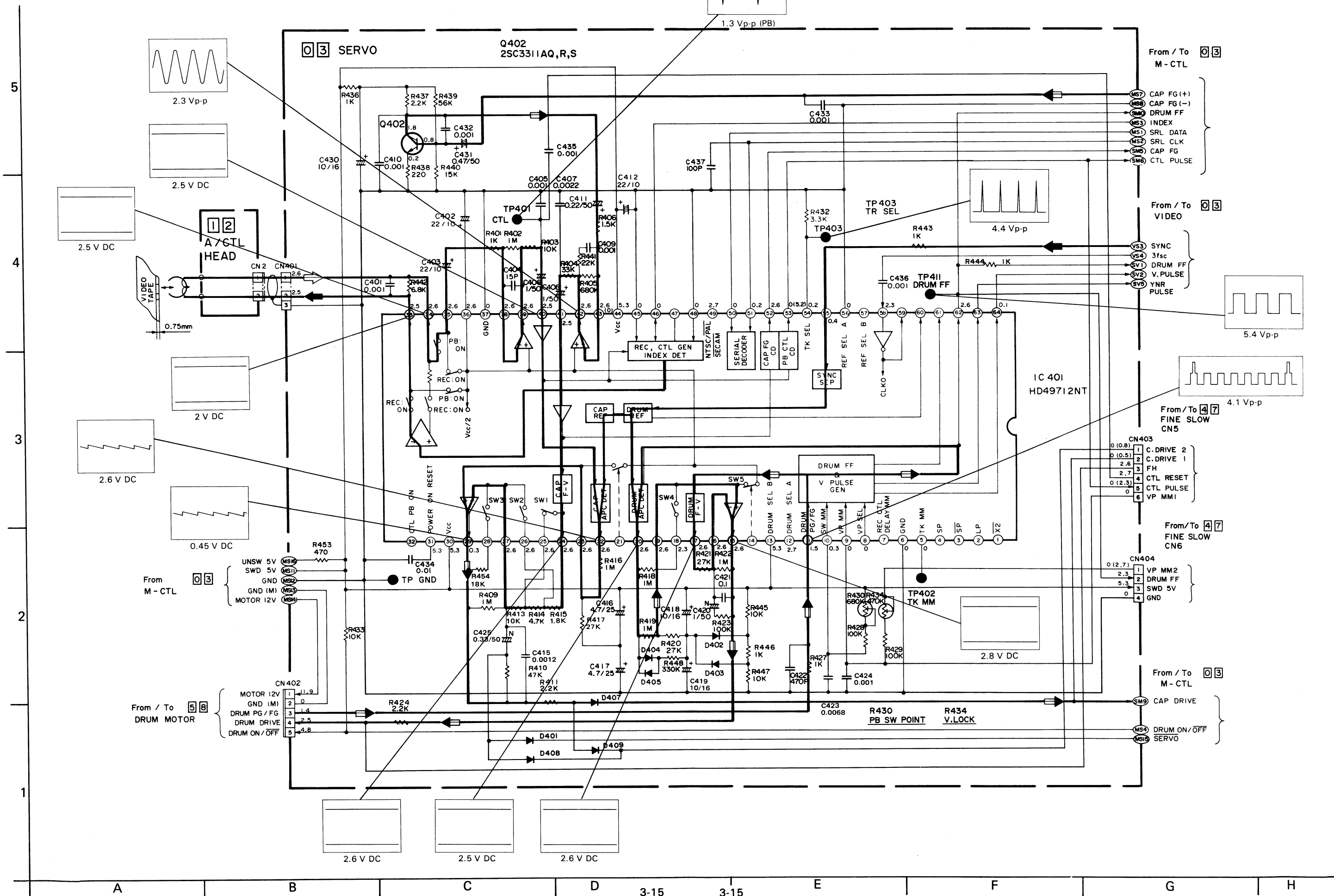
5
4
3
2
1



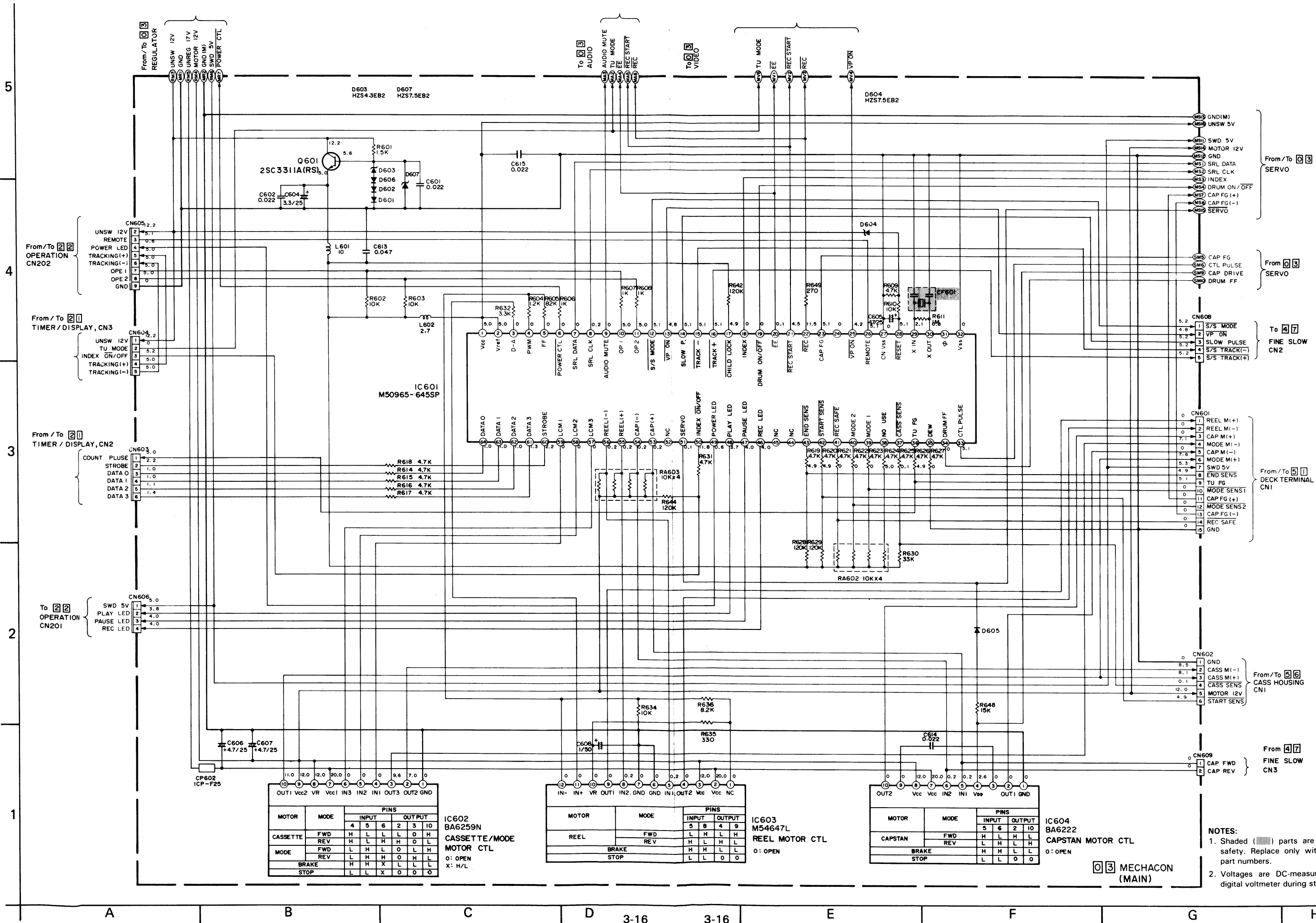
A B C D 3-13 3-13 E F G H

3.13 AUDIO SCHEMATIC DIAGRAM





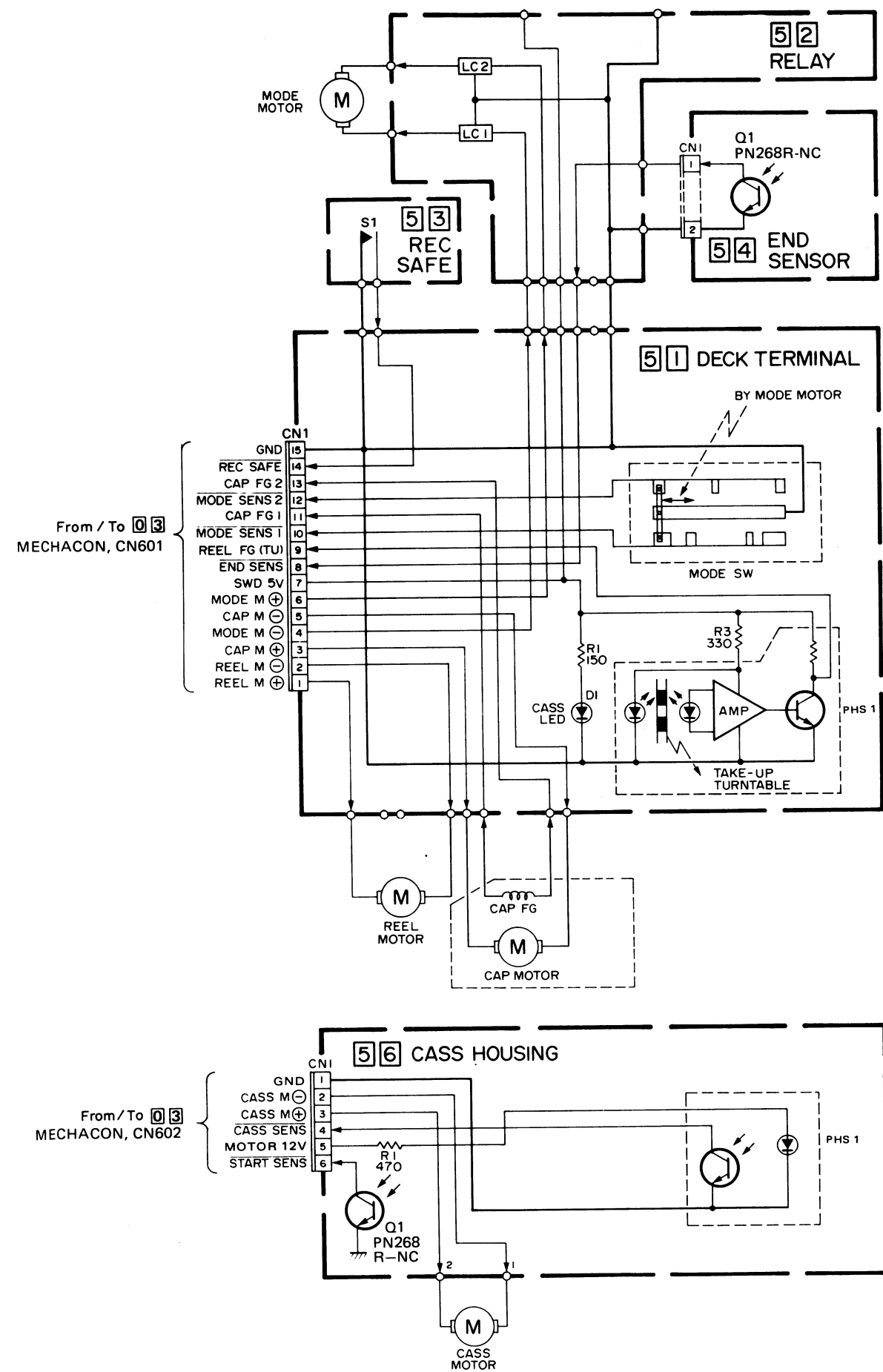
3.15 MECHANISM CONTROL SCHEMATIC DIAGRAM



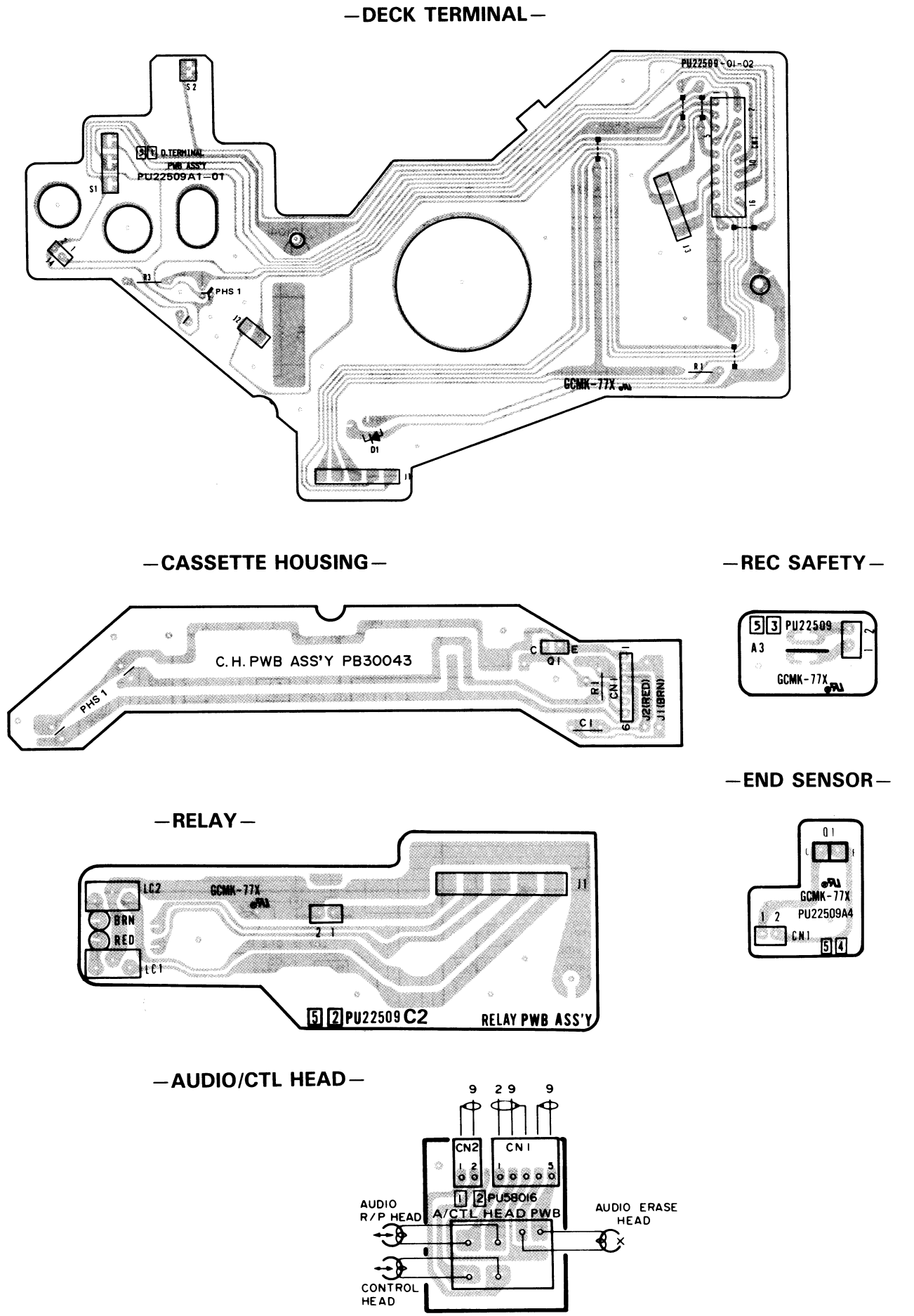
- NOTES:
1. Shaded (■) parts are critical for safety. Replace only with specified part numbers.
 2. Voltages are DC-measured with a digital voltmeter during stop mode.

03 MECHA CON (MAIN)

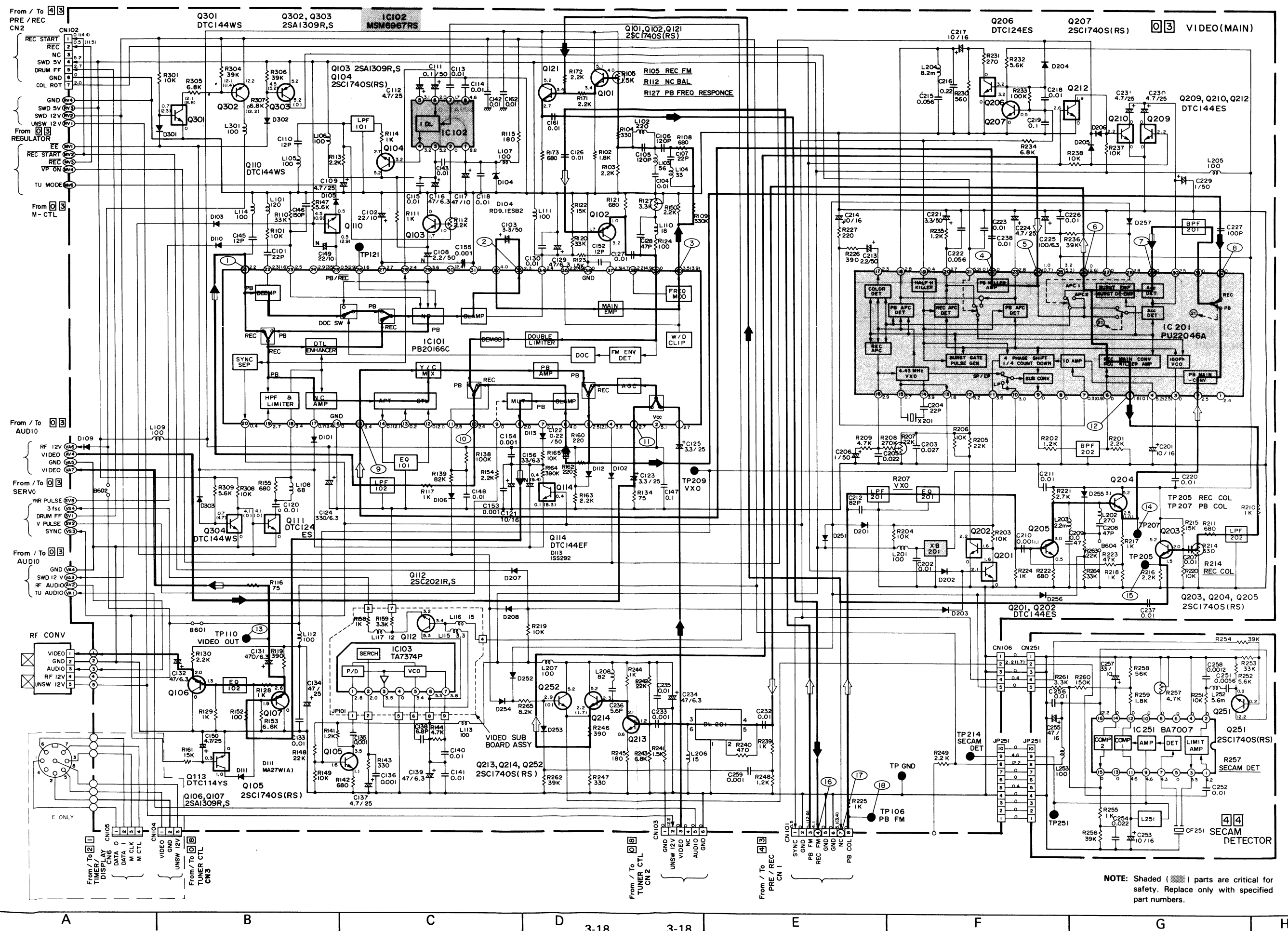
3.16 DECK TERMINAL SCHEMATIC DIAGRAMS



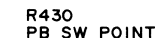
3.17 DECK TERMINAL CIRCUIT BOARDS



3.18 VIDEO SCHEMATIC DIAGRAM

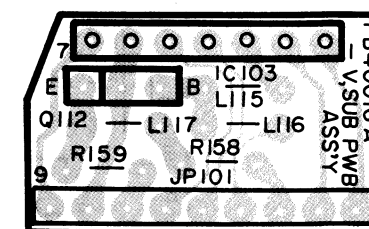


— MAIN —

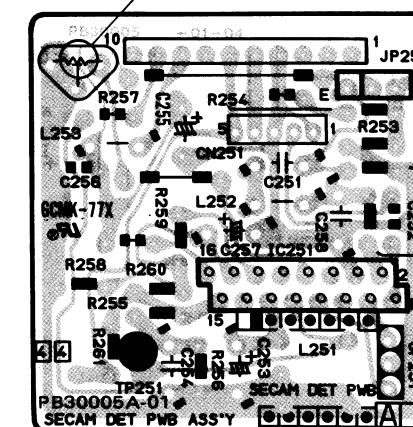


R41
AUDIO BIAS

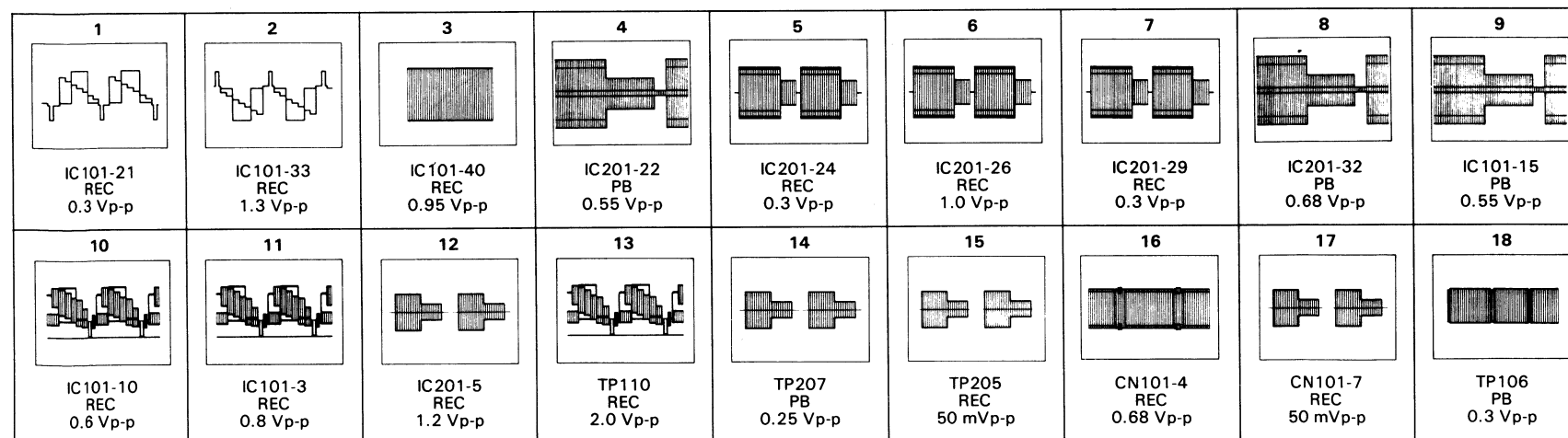
— VIDEO SUB —



R257 —SECAM DETECTOR—
SECAM DET



—Waveforms of VIDEO circuit—



3-19

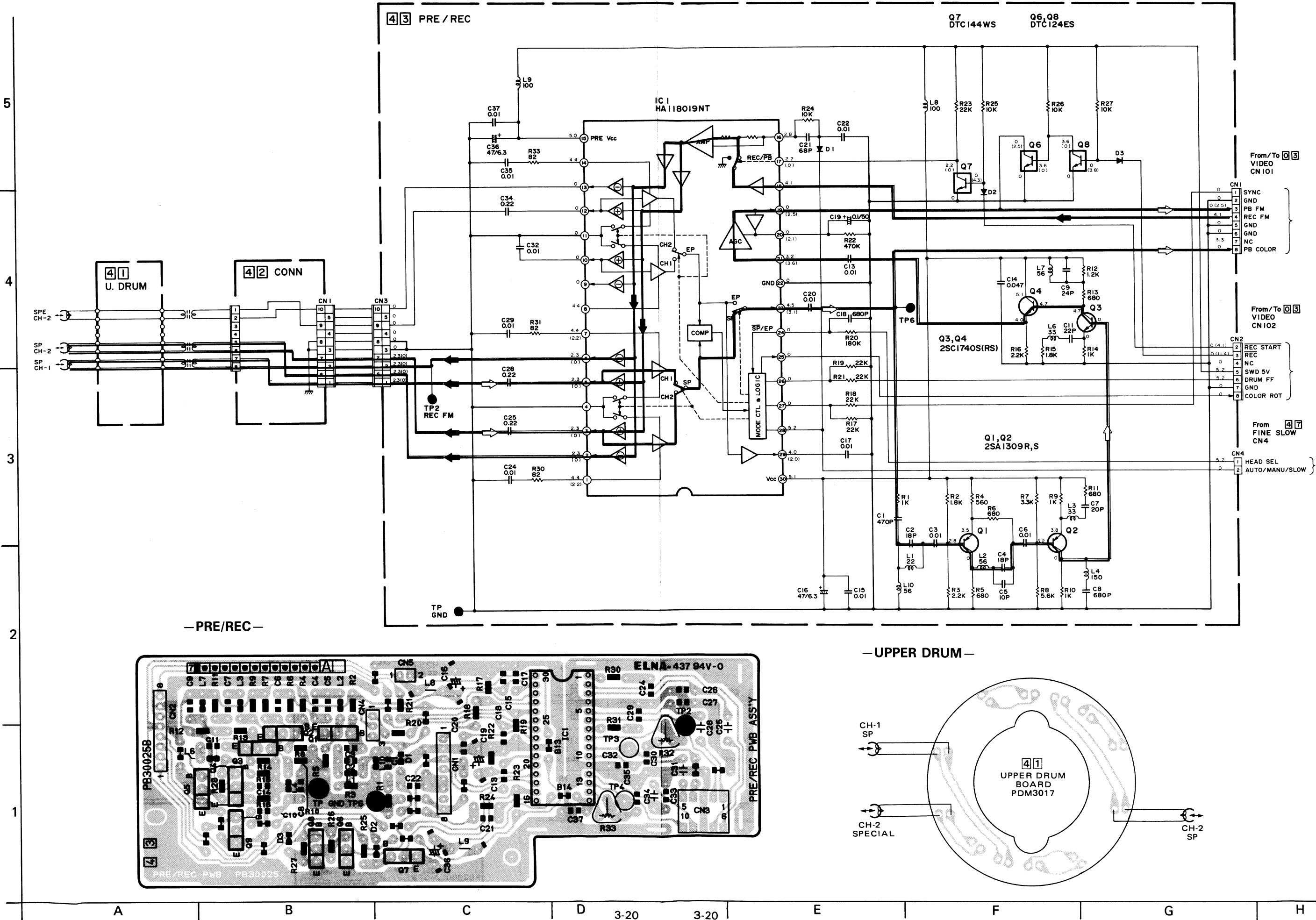
3-19

E

C

I

3.20 PRE/REC SCHEMATIC DIAGAM AND CIRCUIT BOARD

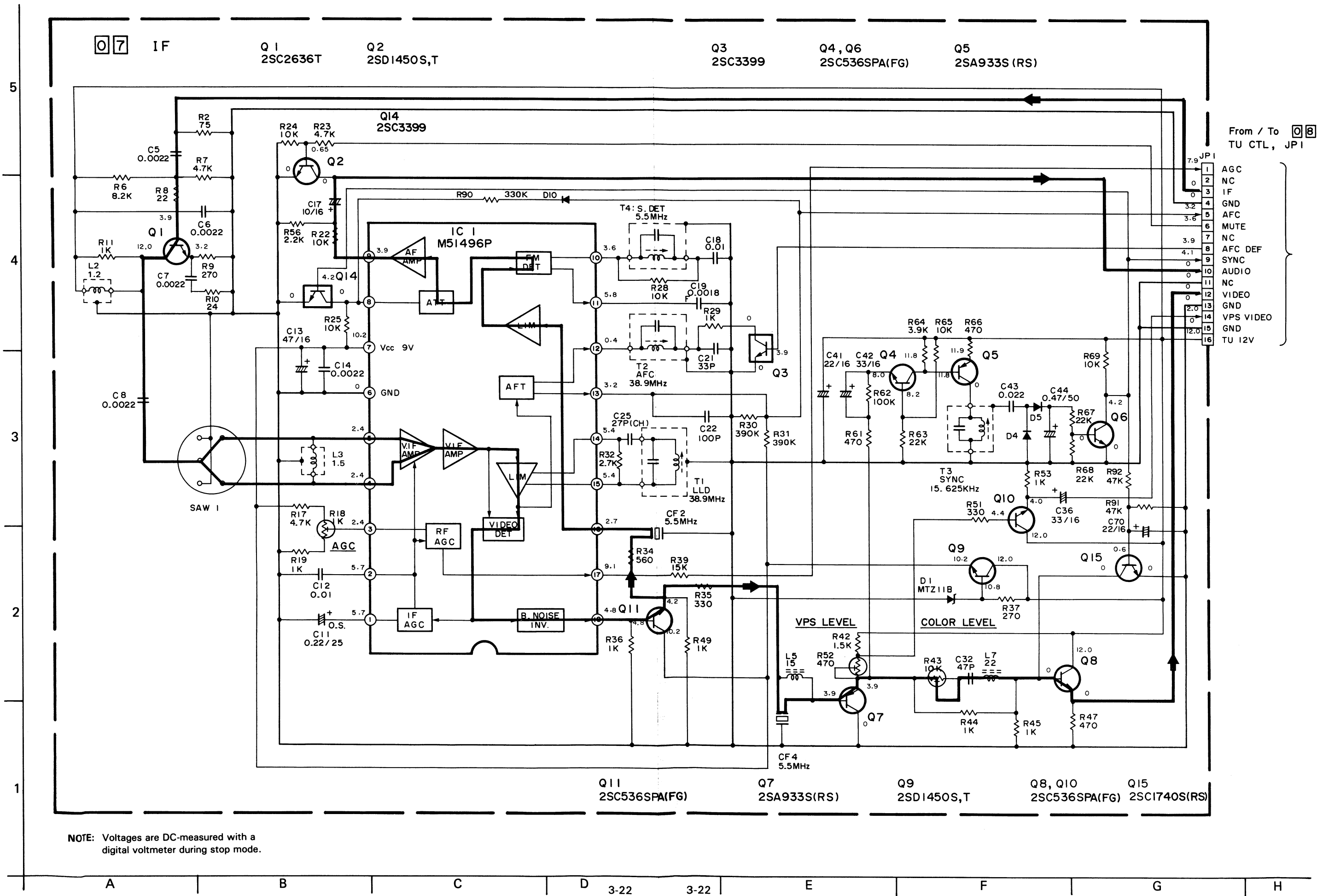


A vertical number line with tick marks labeled 1, 2, 3, 4, and 5 from bottom to top.

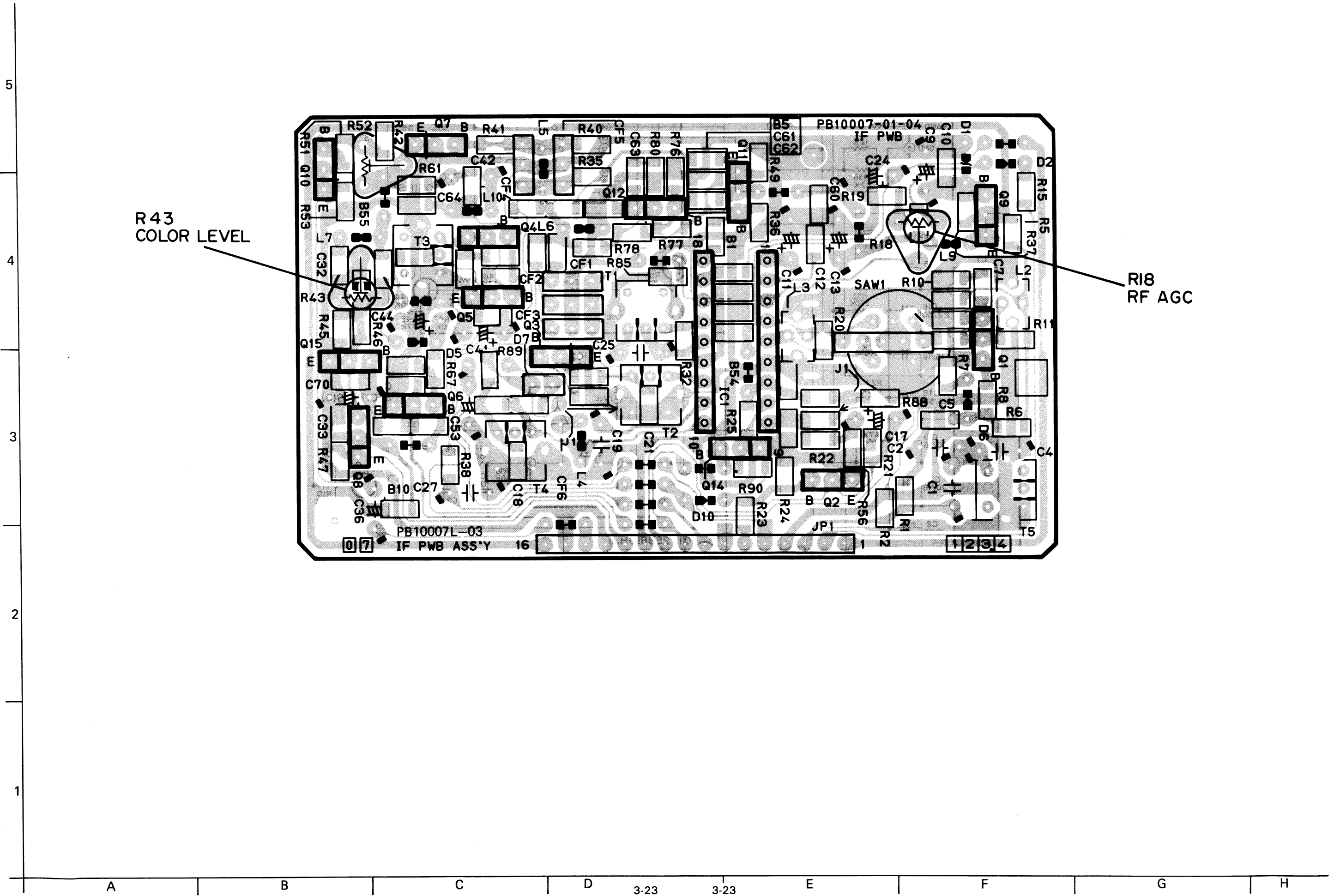


1. Shaded (▒) parts are critical for safety. Replace only with specified part numbers.
2. Voltages are DC-measured with a digital voltmeter during PB (SLOW) mode.

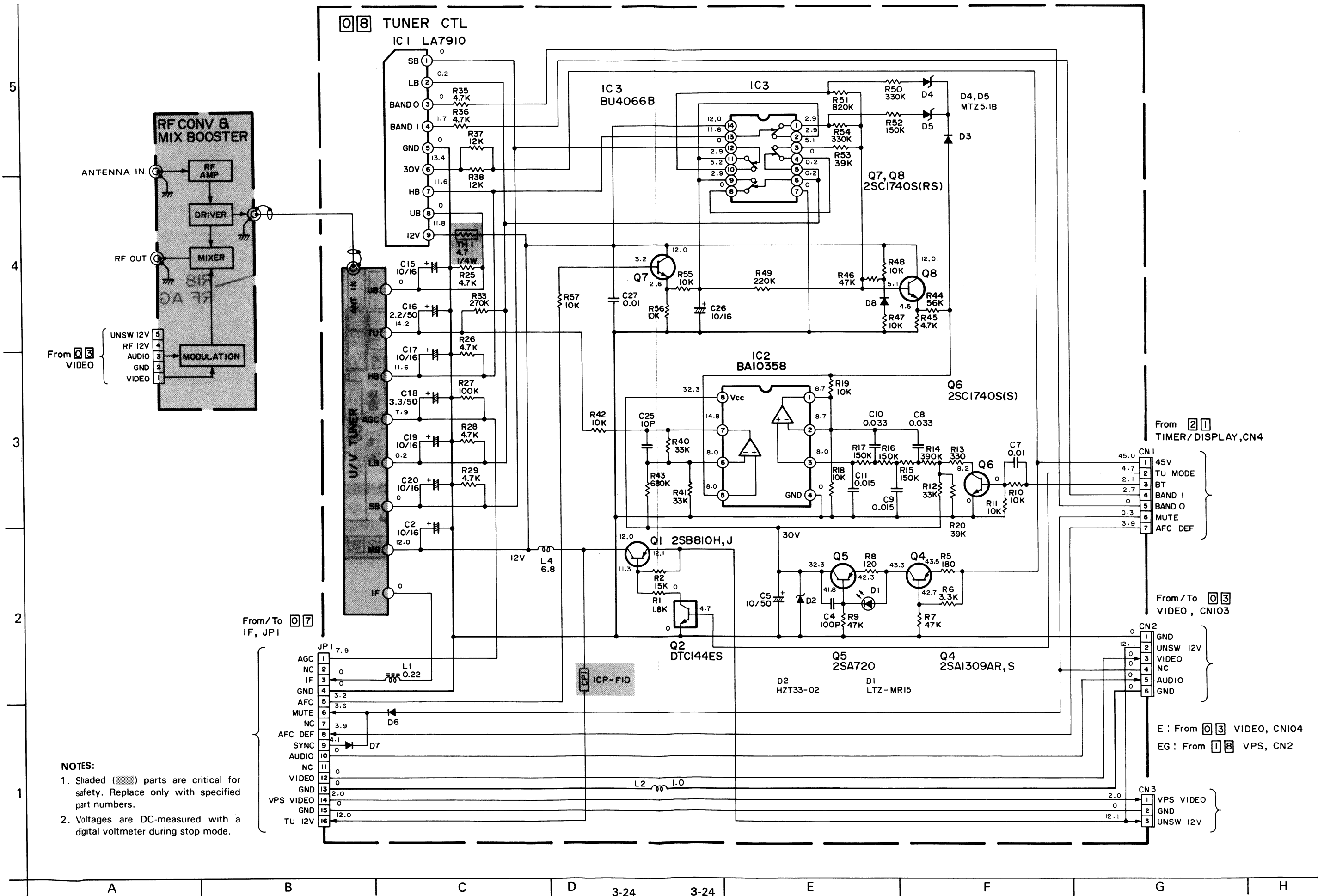
3.22 IF SCHEMATIC DIAGRAM



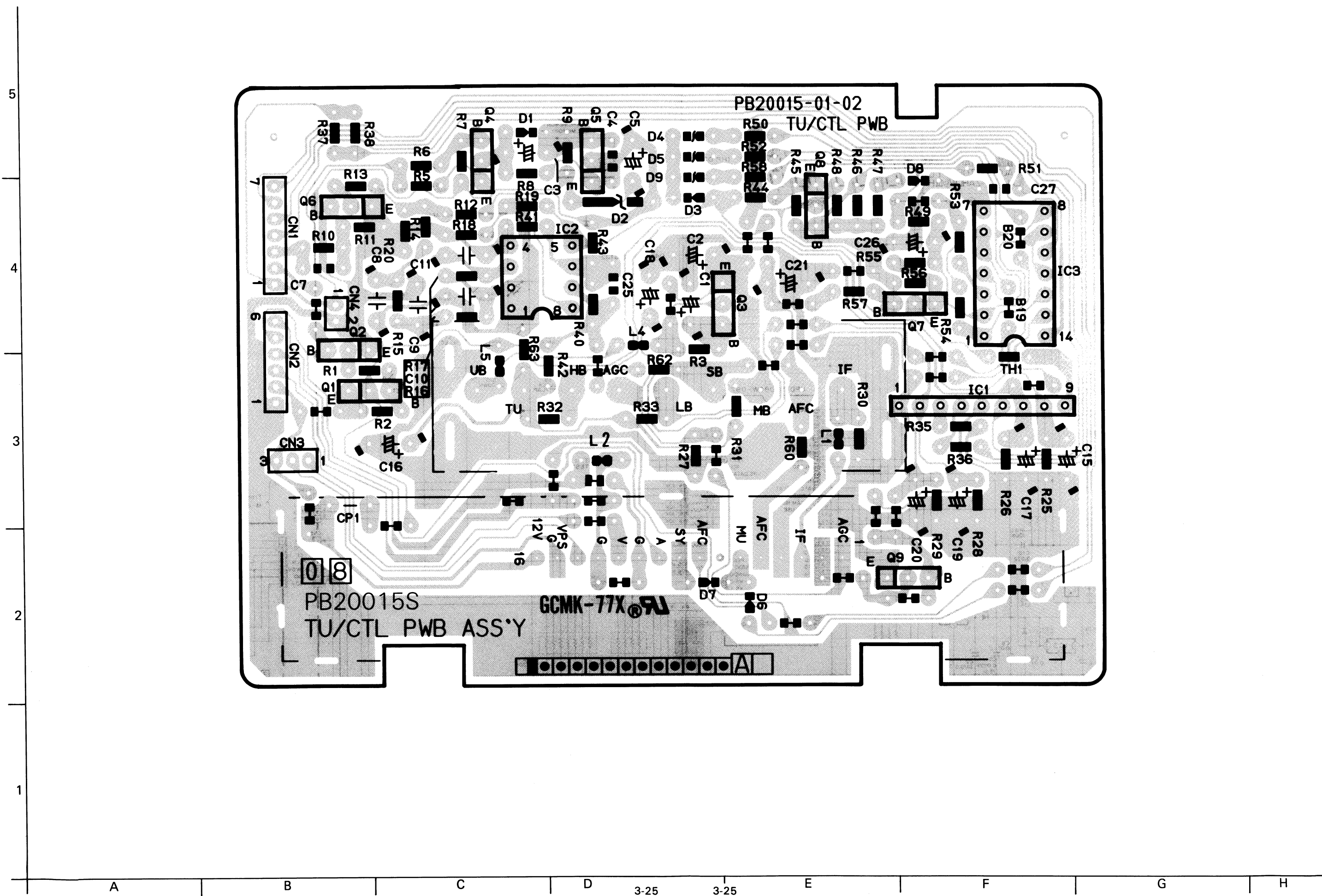
3.23 IF CIRCUIT BOARD



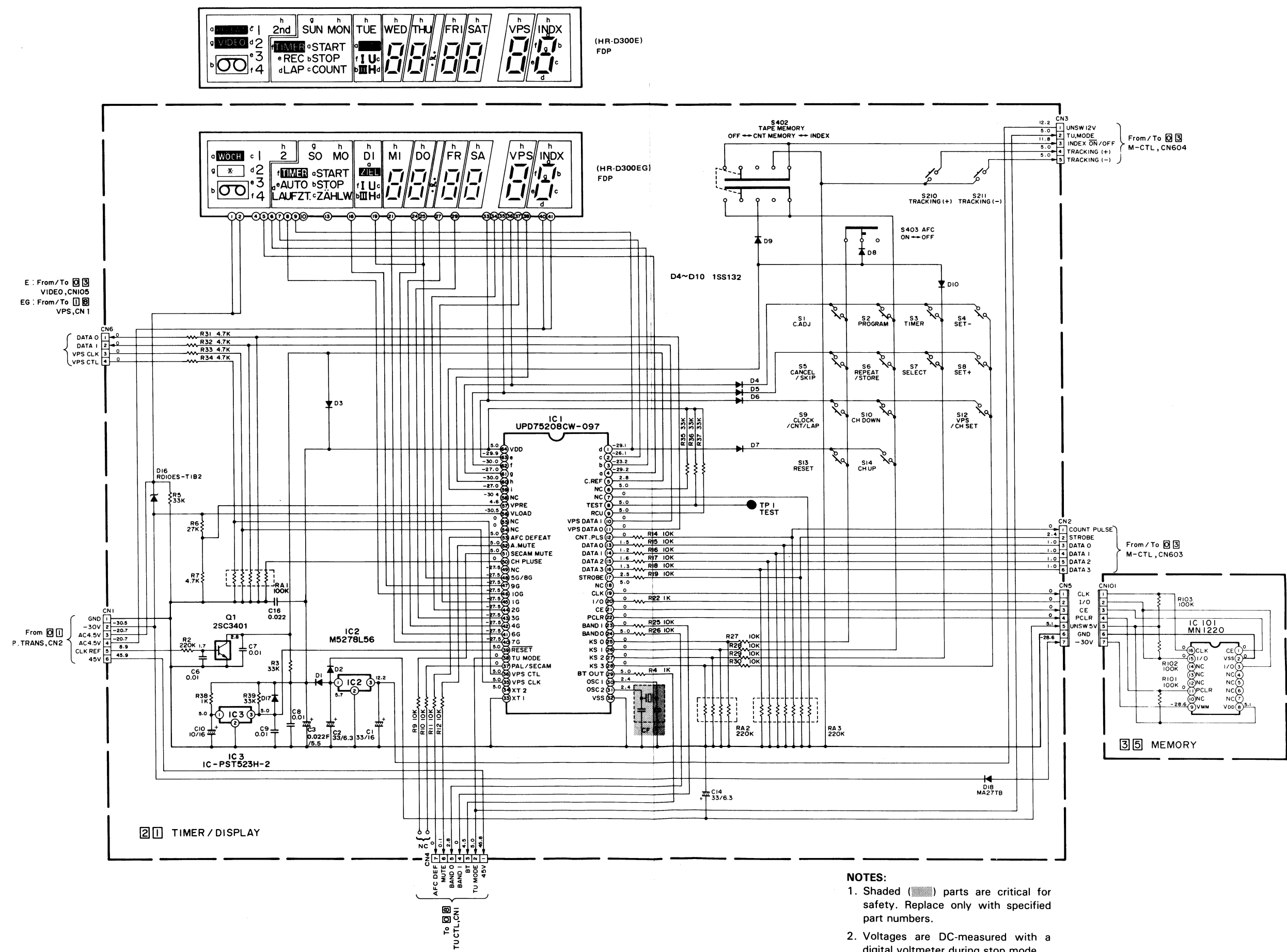
3.24 TUNER CTL SCHEMATIC DIAGRAM



3.25 TUNER CTL CIRCUIT BOARD

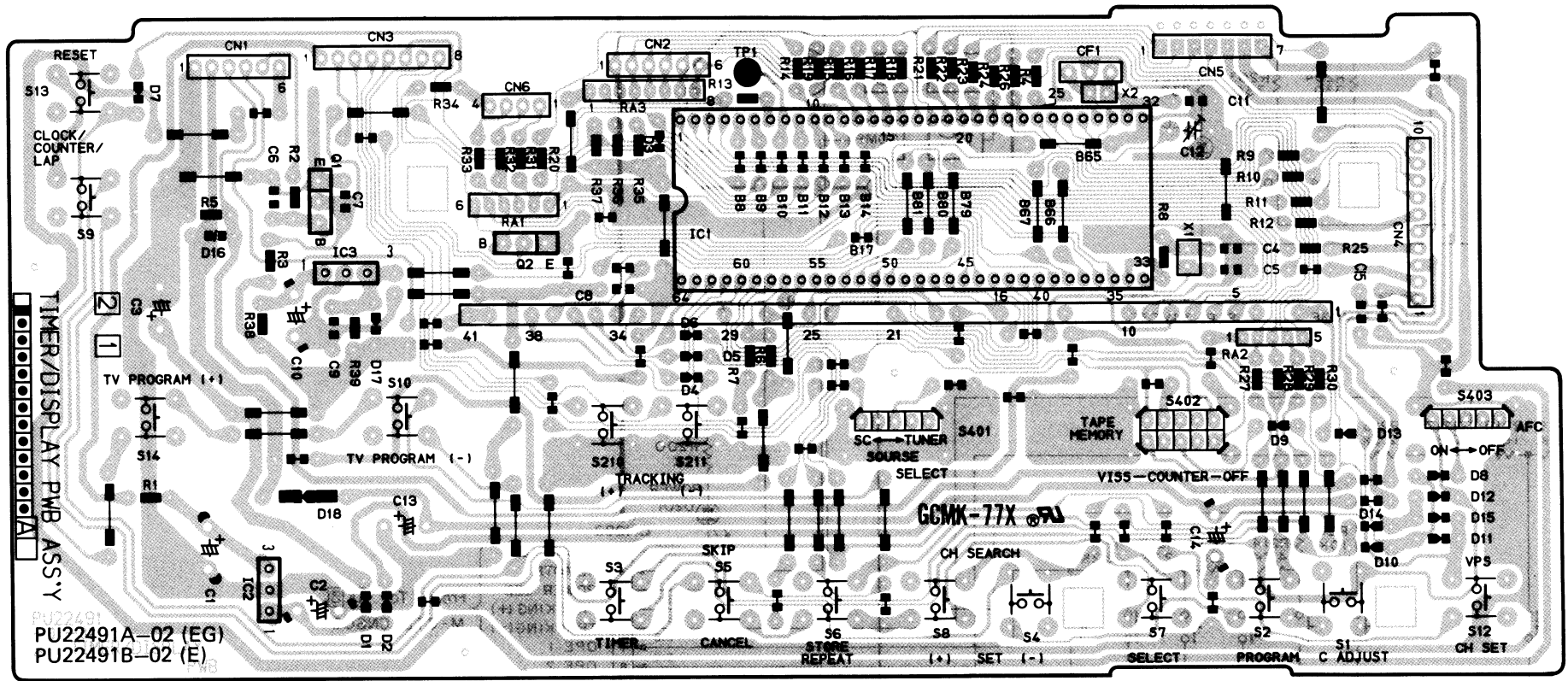


3.26 TIMER/DISPLAY AND MEMORY SCHEMATIC DIAGRAMS

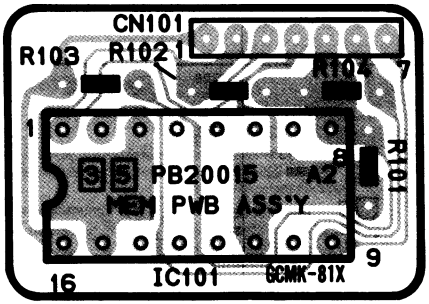


3.27 TIMER/DISPLAY AND MEMORY CIRCUIT BOARDS

—TIMER/DISPLAY—



—MEMORY—



5



3



B

C

D

3-28

3-28

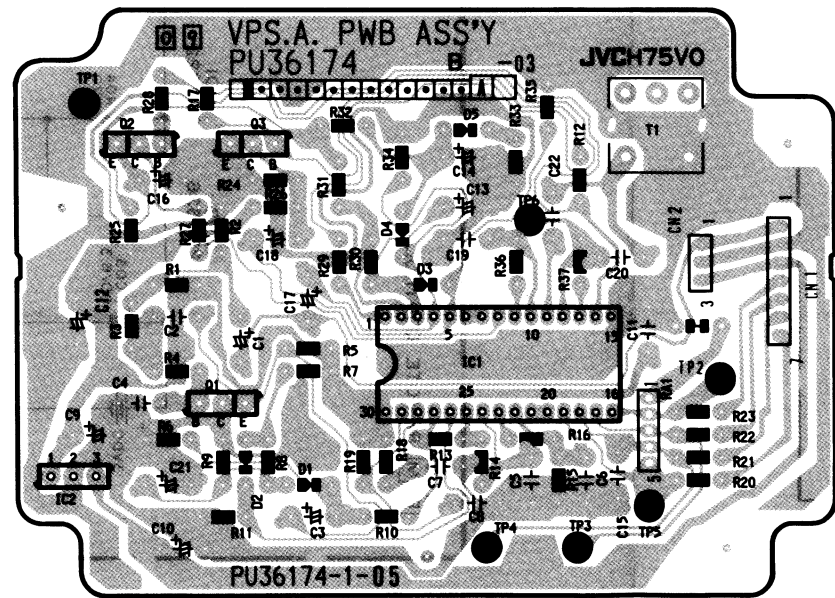
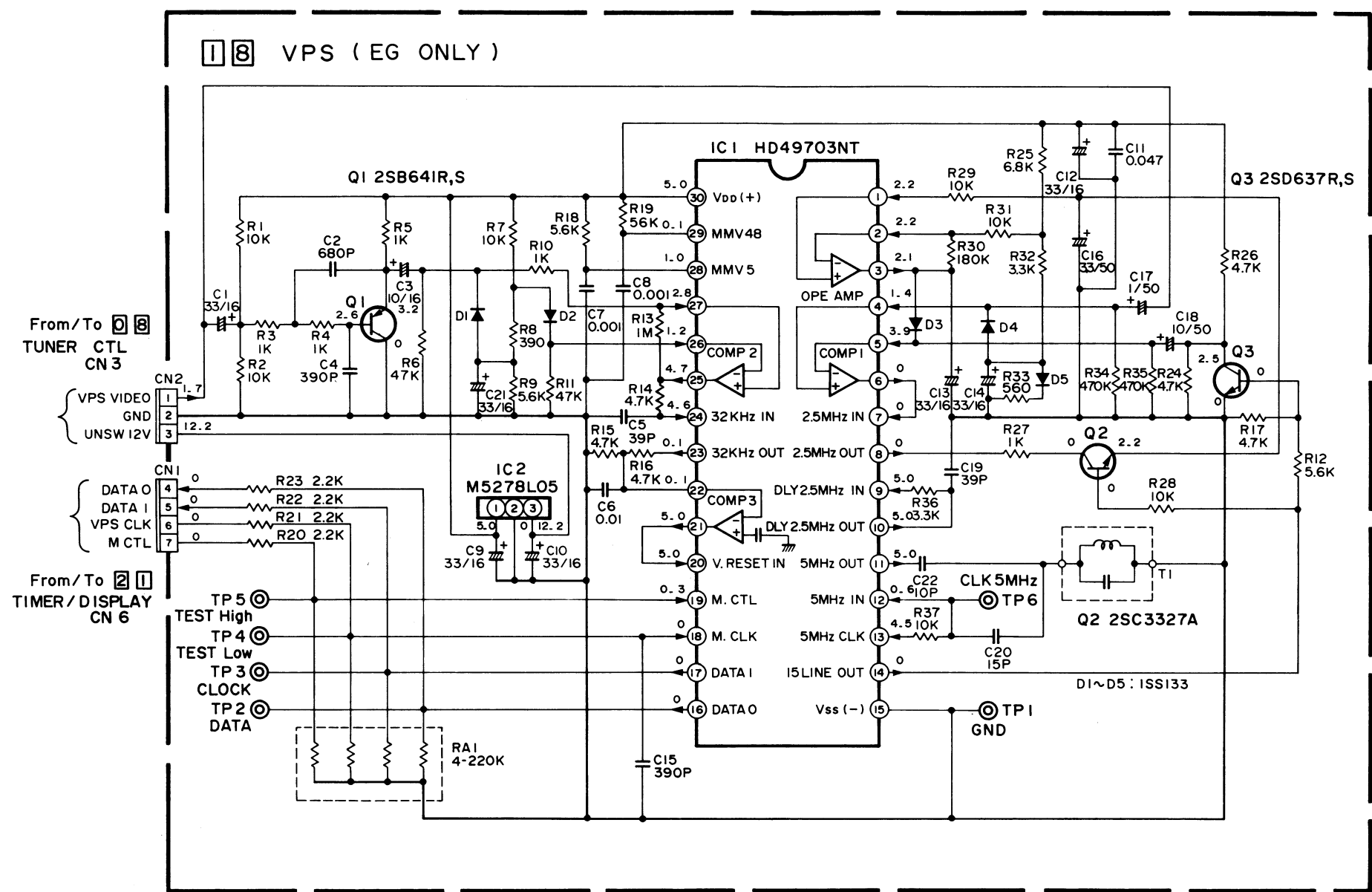
E

F

G

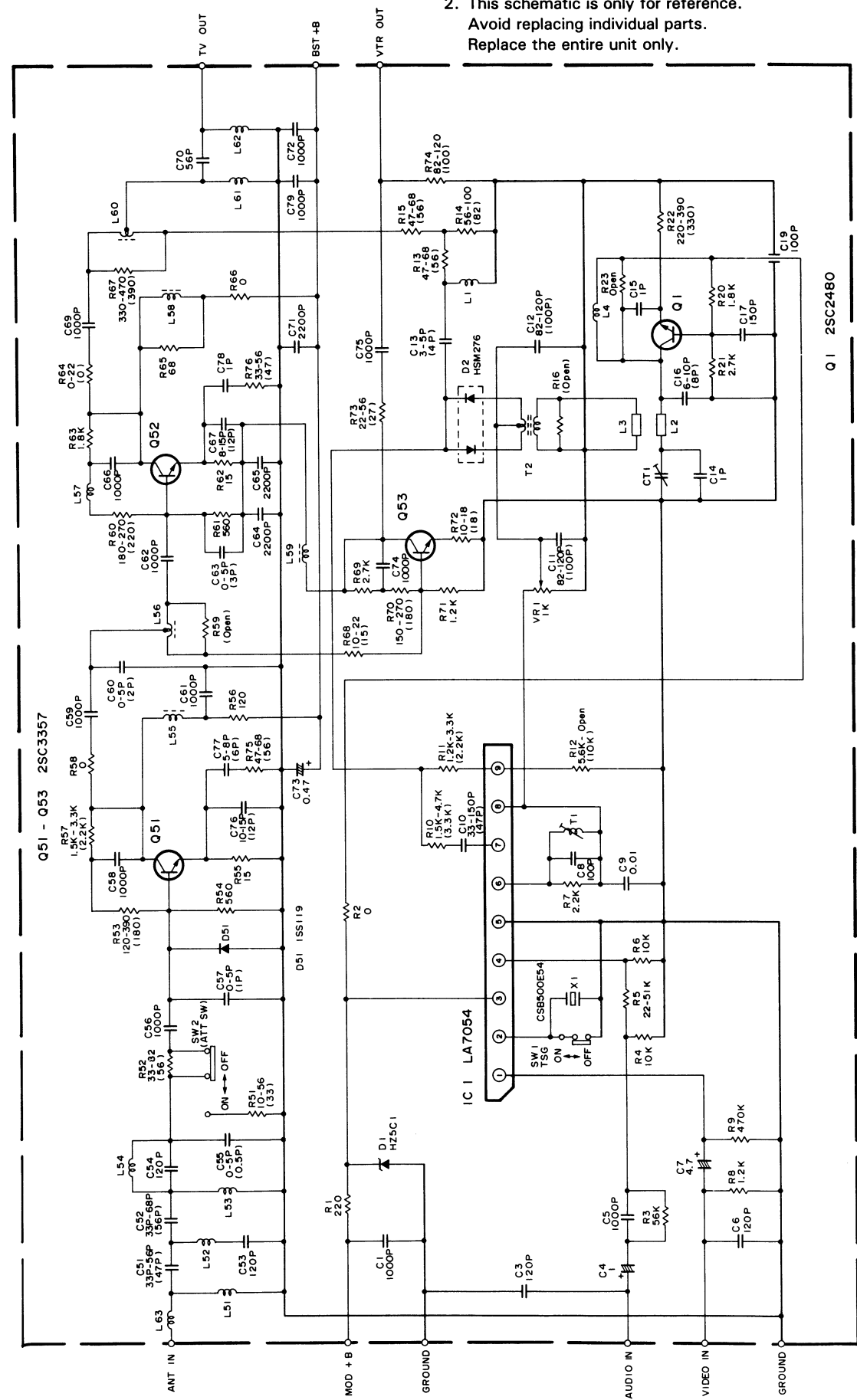
4

3.29 VPS SCHEMATIC DIAGRAM AND CIRCUIT BOARD (EG MODEL ONLY)



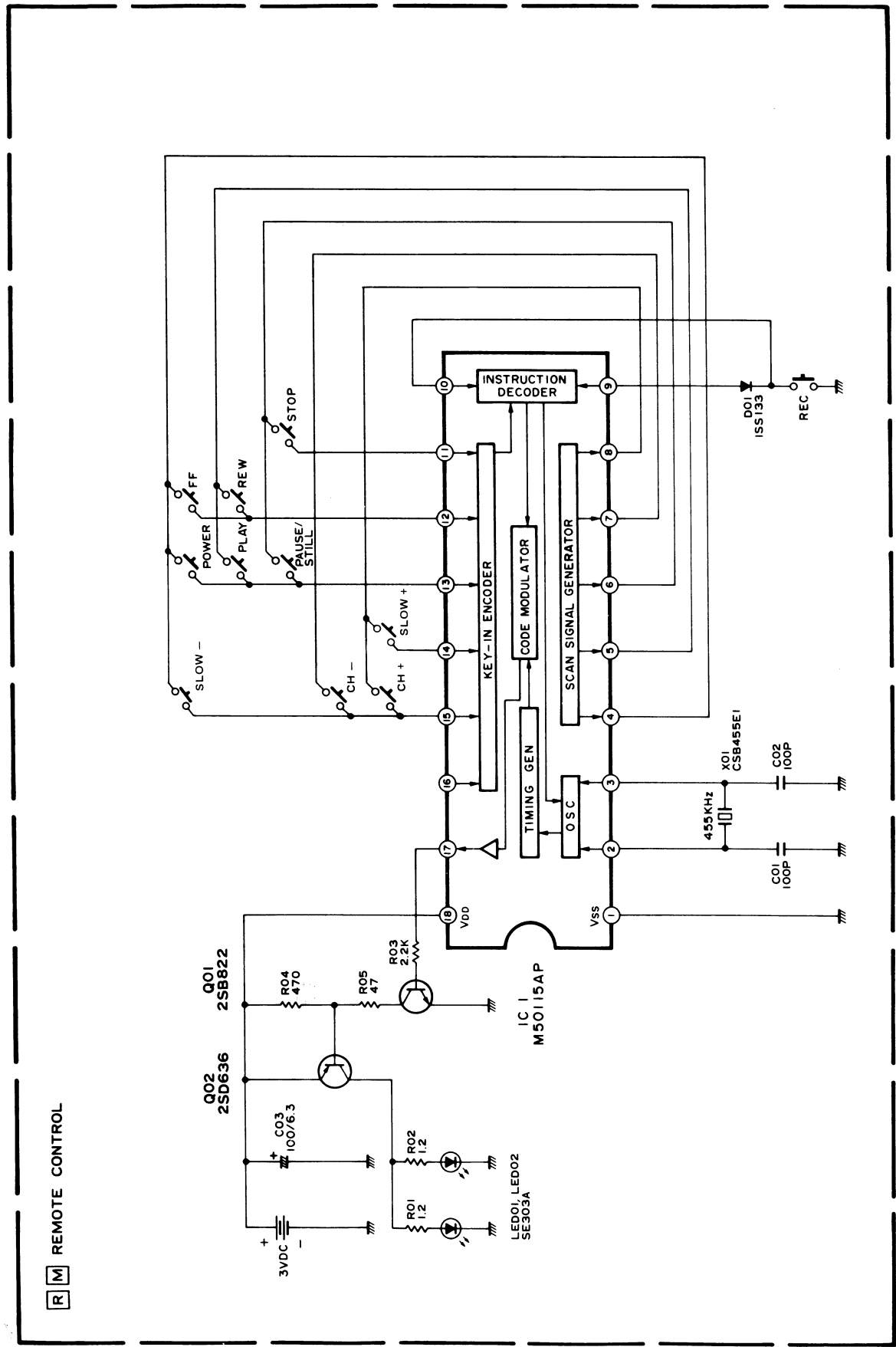
NOTE:
Voltages are DC-measured with a digital voltmeter during stop mode.

3.30 RF CONVERTER AND MIX BOOSTER SCHEMATIC DIAGRAM



NOTES:
1. All parts shown in this schematic are critical for safety.
2. This schematic is only for reference.
Avoid replacing individual parts.
Replace the entire unit only.

3.31 REMOTE CONTROL SCHEMATIC DIAGRAM



NOTE: This schematic parts are critical for safety.
Replace only with specified part numbers.

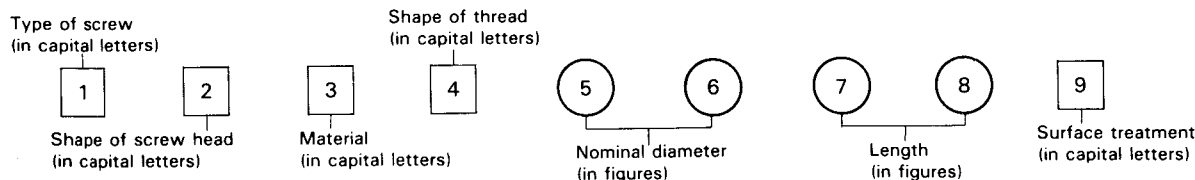
SECTION 4

EXPLODED VIEWS AND PARTS LIST

4.1 STANDARD PART NUMBER CODING

4.1.1 Screw coding

Standard screw part numbers are as follows.

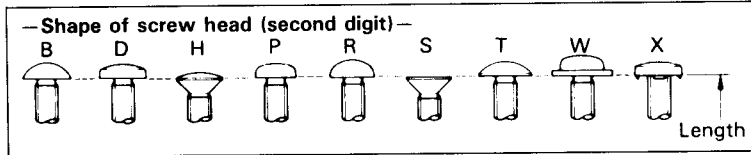
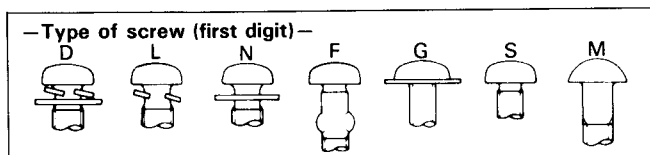


Type of screw (first digit)

- S Normal screws
- D Assembled machine screws (with plain and spring washers)
- L " (with spring washer)
- N " (with plain washer)
- F Feather screws
- G Washer head tapping screws
- M Wood screws

Shape of screw head (second digit)

- B Brazier head
- D Binding head
- H Oval countersunk head
- P Pan head
- R Round head
- S Flat head
- T Truss head
- W Washer head (machine screws)
- X Toothed head



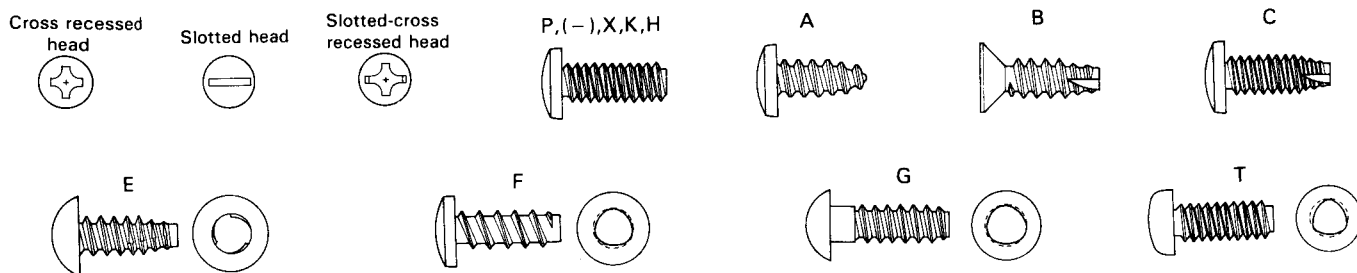
Material (third digit)

- S Steel
- E Stainless steel
- C Cast iron
- U Copper
- B Brass
- P Phosphor bronze
- N Nickel silver
- Y Cast brass
- A Aluminum
- Z Zinc alloy
- K Polycarbonate

Shape of thread (fourth digit)

- P Cross recessed head screws
- (-) Slotted head machine screws
- X Slotted-cross recessed head machine screws
- K Cross recessed head machine screws for precision equipment (type 1)
- H " (type 3)
- A Cross recessed head tapping screws (type 1)
- B " (type 2)
- C " (type 3)
- E Cross recessed head special tapping screws (brand : evertight)
- F " (brand : P-tight)
- T " (brand : taptight)
- G " (brand : taptight)

Shape of thread (fourth digit)



Nominal diameter (fifth and sixth digits)

The fifth and sixth digits indicate a nominal diameter or dimension. If the dimension exceeds 10 mm, three digits are used. The number indicates a nominal diameter or dimension, given in millimeters, multiplied by ten.

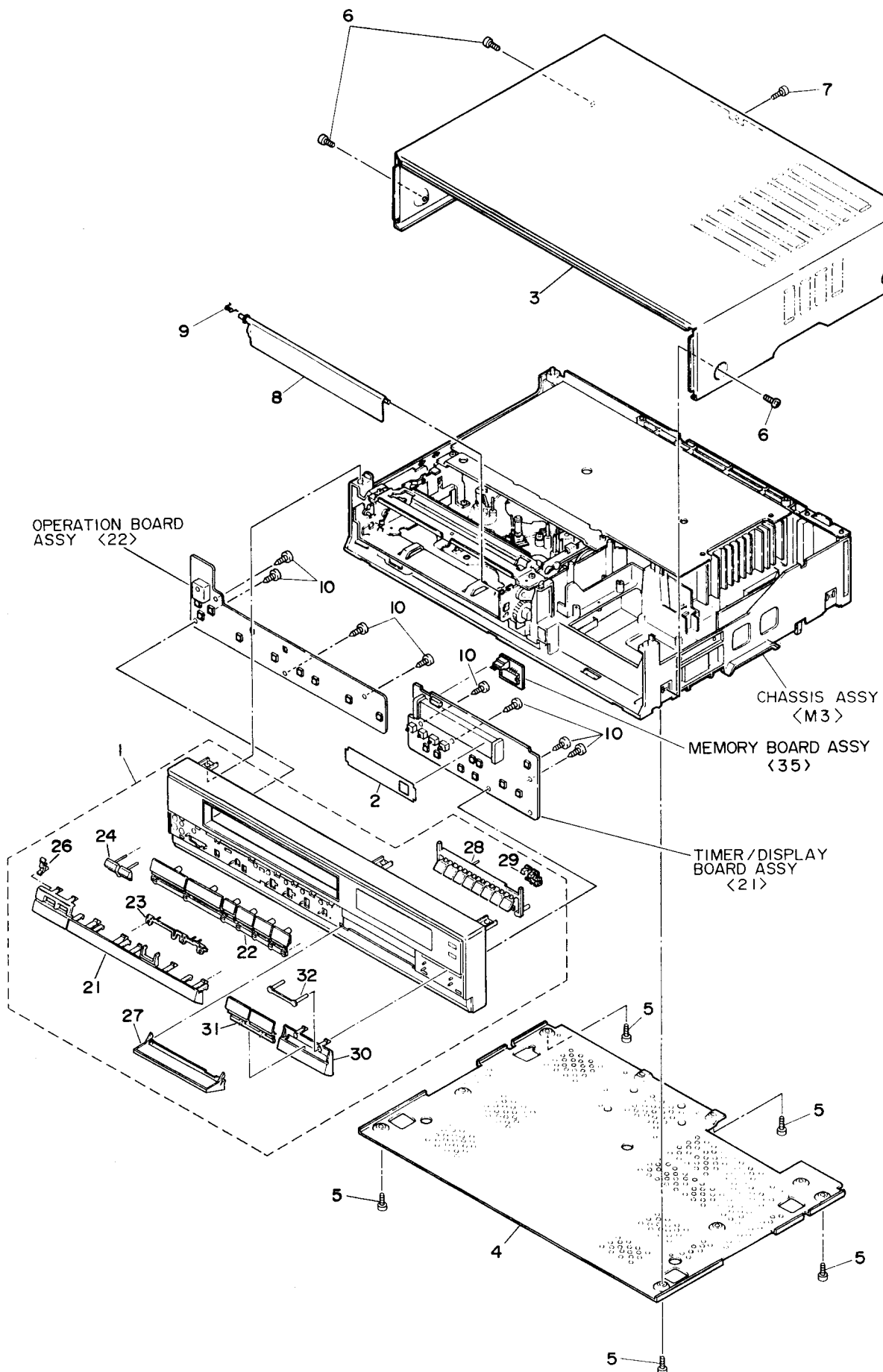
Surface treatment (ninth digit)

- Z Dichromate treatment after galvanizing (MFZn II-C)
- N Nickel plating (MFNiII, MFNiI)
- R Chromium plating (MBCrII, MBCrI)
- G Silver plating (SP4)
- B Black coating after plating
- F Blackening of iron (FB)
- M Blackening after galvanizing
- K Pickling of brass (PF2)
- P Phosphate treatment
- W Uni-chrome plating
- L Coated with transparent paint
- A Colored red after galvanizing (MFZnII-C)
- C Colored blue after galvanizing (MFZnII-C)
- T Colored green after galvanizing (MFZnII-C)
- V Colored purple after galvanizing (MFZnII-C)

Length (seventh and eighth digits)

The seventh and eighth digits indicate length in millimeters. The preceding figure is zero when the dimension is smaller than 10 mm. For machine screws used in precision equipment whose length is given in units of 0.1 mm, the number indicates ten times the size of their length.

4.2 CABINET ASSEMBLY <M2>



#REF NO. PART NO. PART NAME, DESCRIPTION

* CABINET ASSEMBLY <M2> *

1	PQ10479P-7	FRONT PANEL ASSY, INCL. 21-32, E
2	PQ10479N-7	FRONT PANEL ASSY, INCL. 21-32, EG
3	PQ42382-2	SHEET
4	PQ10473-2-5	TOP COVER
5	PQ10472-1-2	BOTTOM COVER
6	SDSF3008Z	TAPPING SCREW, X5
7	SDSA4014M	TAPPING SCREW, X4
8	SDSF3010M	TAPPING SCREW
9	PQ31267-84	C. HOUSING DOOR
10	PQ42410-1-1	TORSION SPRING
	SDSF2608Z	TAPPING SCREW, X8
21	PQ20436-3	COVER (OPERATION), EG
22	PQ20436-4	COVER (OPERATION), E
23	PQ20294-3	OPERATION BUTTON
24	PQ31227	OPERATION INDICATOR
25	PQ31204-3	POWER BUTTON
26	PQ42355	POWER INDICATOR
27	PQ31228AG	DOOR ASSY, E
28	PQ31228AE	DOOR ASSY, EG
29	PQ31384-2	PROGRAM BUTTON, EG
30	PQ31384-5	PROGRAM BUTTON, E
	PQ31206	COUNTER BUTTON
	PQ31702-3	COVER (CHANNEL), E
	PQ31702-2	COVER (CHANNEL), EG
31	PQ31703	BUTTON (CHANNEL)
32	PQ43015	PIN

#REF NO. PART NO. PART NAME, DESCRIPTION

* CHASSIS ASSEMBLY <M3> *

1	PQ43013	FOOT, X2
2	PQ43023	EARTH PLATE
3	PQ43011	EARTH PLATE, X3
4	SDSP2608Z	SCREW, X3
5	SDSA4014Z	TAPPING SCREW, X2
6	PQ41396	SPECIAL SCREW
7	PUS28277H	CASS. HOUSING ASSY, INCL. 41-46
8	SDST2605Z	TAPPING SCREW, X2
9	SDST2605Z	TAPPING SCREW, X2
10	SDSA4014Z	TAPPING SCREW, X4
11	SDST3006Z	TAPPING SCREW, X2
12	SDSF3008Z	TAPPING SCREW, X2
13	PQ43012	EARTH PLATE
14	SDST2605Z	TAPPING SCREW
15	SDSA2608Z	TAPPING SCREW, X2
16	GPSF2610Z	TAPPING SCREW, X3
17	GPST2608Z	TAPPING SCREW, X2
18	SDSF3010M	TAPPING SCREW
19	PU60178	POWER TRANSFORMER
20	PQ20438-3-2	TERMINAL BOARD, E
	PQ20438-1-2	TERMINAL BOARD, EG
21	PQ31171-2-7	DRUM SHIELD
22	SDST2605Z	TAPPING SCREW, X2
23	SDSF3008Z	TAPPING SCREW
24	QMP3980-200	POWER CORD
25	PQ31670	TRANS BRACKET
26	QHS3771-108	STRAIN RELIEF
31	PDM2087A	UPPER DRUM ASSY
32	PDM4001A	DRUM SCREW ASSY, X2
33	PDM2053N-12	LOWER DRUM MOTOR ASSY
34	PDM4015A-4	BRUSH ASSY
35	DPSP2606Z	SCREW
41	PQ42385A	CASSETTE MOTOR ASSY
42	OR PQ42385B	CASSETTE MOTOR ASSY
43	SPSP2603Z	SCREW, X2
44	PQM30003-19	BELT
45	SPSP2604Z	SCREW
46	SPST2605Z	TAPPING SCREW, X2
	DV710SR223M16	VARISTOR

4.3 CHASSIS ASSEMBLY <M3>

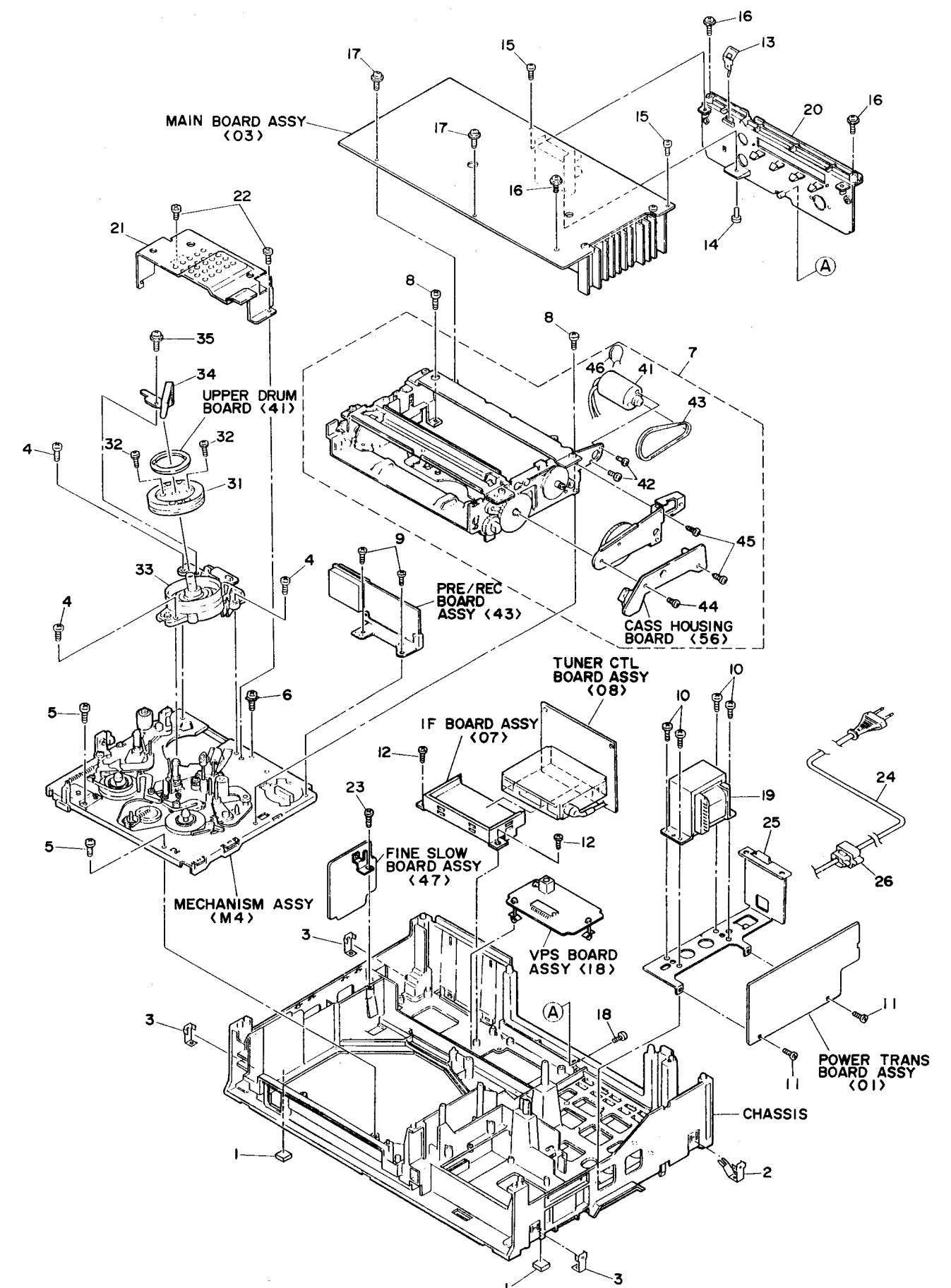


Diagram illustrating the exploded view of a VCR main deck assembly. The central component is the **MAIN-DECK**. Key sub-assemblies and parts are labeled:

- AUDIO/CONTROL BOARD (12)**: Located at the top right.
- END SENSOR BOARD ASSY (54)**: Located at the bottom left.
- REC SAFETY BOARD ASSY (53)**: Located at the bottom right.

Numbered parts (1 through 100) are shown in their relative positions, connected by dashed lines indicating assembly paths. The diagram includes various mechanical components such as gears (46, 47), rollers (9, 10, 11, 12), and structural brackets (5, 6, 7, 8, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100).



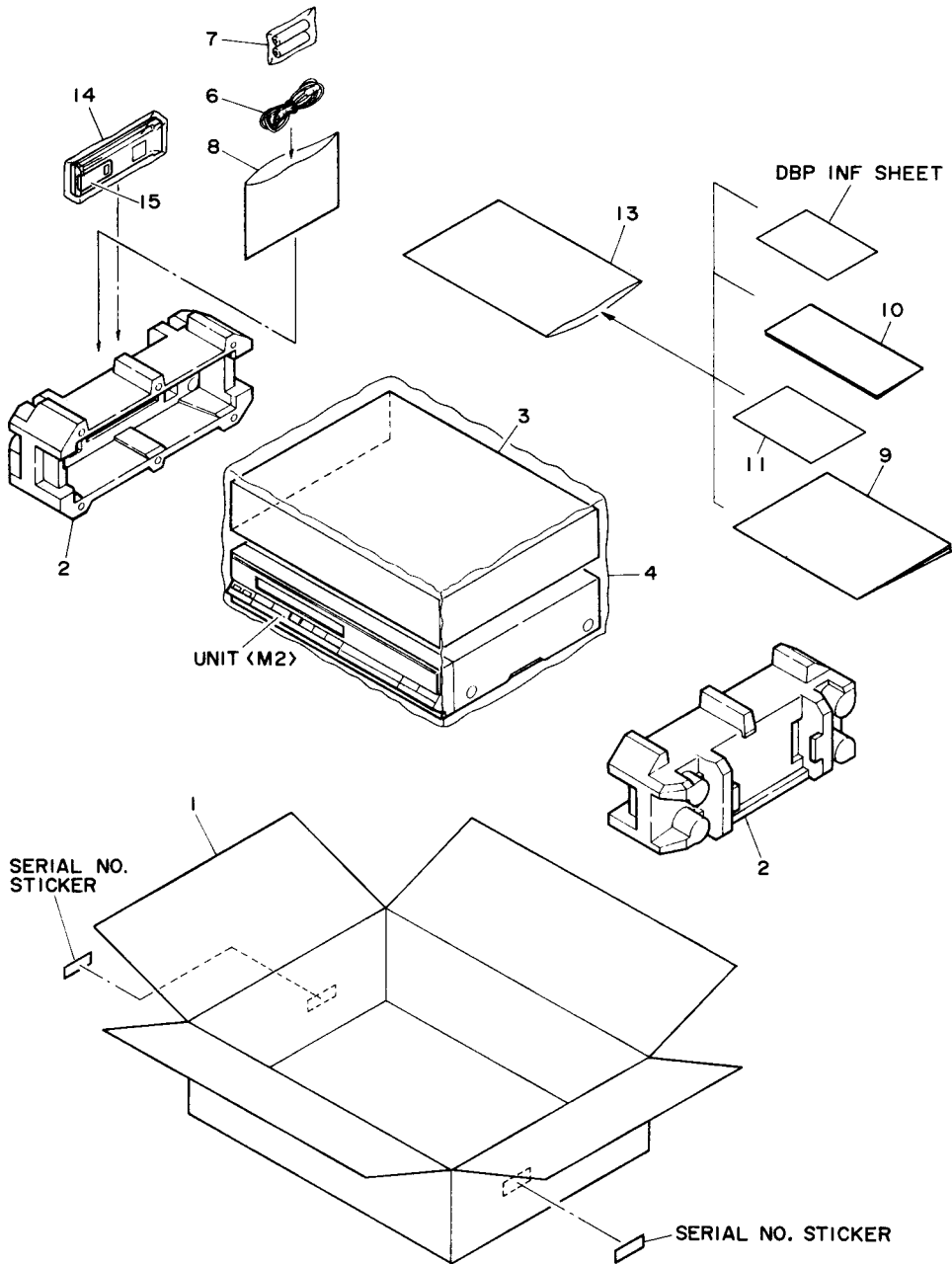
#	REF NO.	PART NO.	PART NAME, DESCRIPTION

* MECHANISM ASSEMBLY <M4> *			

1		PQ41944A-7	TENSION ARM ASSY,INCL.2
2		PQ41952-3	SPRING
3		PQ41948A	TENSION BAND ASSY
4		SDST2606Z	TAPPING SCREW
5		PU57641-2	FULL ERASE HEAD
6		PQ31036	FULL ERASE HEAD BASE
7		SPSG2606Z	TAPPING SCREW
8		PQ41954-1-1	TORSION SPRING
9		PQ41955	IMPEDANCE ROLLER
10		PQ41956	COLLAR
11		PQ41957	LOWER FLANGE
	OR	PQ42958	LOWER FLANGE
12		PQM30018-39	SPACER
	OR	PQM30018-50	SPACER
13		PQM30002-124	COMPRESSION SPRING
14		PQ40353	NYLON NUT
15		PU59253	AUDIO/CONTROL HEAD
16		PU55535	SHIELD CAP
17		HPSP2015N	SCREW
18		PQ42984-2	HEAD BASE
19		SPSP2608Z	SCREW,X3
20		PU30080-49	SPRING,X3
21		SDSP2606Z	SCREW,X2
22		PQ41963A-2	POLE BASE ASSY(TU)
	OR	PU59994	POLE BASE ASSY(TU)
	OR	PQ43148A	POLE BASE ASSY(TU)
23		PQ41969A-2	POLE BASE ASSY(SUP)
	OR	PQ43147A	POLE BASE ASSY(SUP)
	OR	PU59993	POLE BASE ASSY(SUP)
24		PQM30017-5	SLIT WASHER,X2
25		PU53629-2	TAPE GUIDE
26		PQ40268-2	GUIDE FLANGE,X2
27		PQ42999-2-1	GUIDE POLE CAP
28		SDSP2006Z	SCREW
△ 29		PU60201V	CAPSTAN MOTOR
30		SPSP2605N	SCREW,X3
31		PQ41974A-3	REEL MOTOR BRACKET ASSY
32		PU58645-1-4	IDLER ARM
33		Q03093-834	WASHER
34		PQ41976A-1	SPRING ARM ASSY,INCL.35
35		PQ42212-1-4	SPRING
36		PQM30017-22	SLIT WASHER
37		PQ41978	HOLDER
38		SPST2606Z	TAPPING SCREW
△ 39		PU58636W	REEL MOTOR
△ 40	OR	PU58636M	REEL MOTOR
		LPSP2604Z	SCREW,X2
41		SPST2606Z	TAPPING SCREW,X2
42		PU59250-1-2	REEL DISK(SUP)
43		PU58638-1-2	REEL DISK(TU)
44		PQM30017-5	SLIT WASHER,X2
45		Q03093-828	WASHER,X2
46		PQ41979A-4	LOADING ARM ASSY(SUP)
47		PQ41985B	LOADING ARM ASSY(TU)
48		PQ41992A-1	CAM BRACKET SUB ASSY
49		PQ41994A-2	ARM GEAR ASSY
50		PQ20577-2	CONTROL CAM
△ 51		PQ41996B	MODE MOTOR ASSY
52		PQ41998A	WORM ASSY
53		LPSP2604Z	SCREW,X2
54		PQ42001	WINDMILL
55		PQ42002	CLUTCH SPRING
56		PQ42003	WORM SHAFT
57		PQM30017-5	SLIT WASHER,X2
58		PQM30003-20	BELT
59		PQM30018-22	SPACER
60		SPST2606Z	TAPPING SCREW,X2

#	REF NO.	PART NO.	PART NAME, DESCRIPTION
61		SPST2606Z	TAPPING SCREW,X2
62		SPSP2603Z	SCREW
63		PQ42038D	PLATE ASSY,INCL.64-66
64		PQ31044-1-2	LOCK LEVER
65		PQM30001-191	TENSION SPRING
66		PQM30001-211	TENSION SPRING
67		PQM30017-28	SLIT WASHER,X2
68		PQ42006B	PINCH ROLLER ARM ASSY
69		PQM30017-28	SLIT WASHER
70		Q03093-833	WASHER
71		PQM30001-229	TENSION SPRING
72		PQ42013B-4	GUIDE ARM ASSY,INCL.73
73		PQ42029	SPRING
74		PQM30017-6	SLIT WASHER
75		PQ42019A-6	MAIN BRAKE ASSY(SUP)
76		PQ42020B	MAIN BRAKE ASSY(TU)
77		PQM30001-216	TENSION SPRING
78		PQ42021A-3	SUB BRAKE ASSY(SUP),INCL.79
79		PQ42023-1-2	TENSION SPRING
80		PQ42037A-2	SUB BRAKE ASSY(TU)
81		PQM30017-6	SLIT WASHER
82		PU59925-1-1	LED HOLDER,INCL.LED
83		SPST2606Z	TAPPING SCREW
84		SPST2606Z	TAPPING SCREW
85		PU60444	SLIDE ENCODER
86		SDSP2610Z	SCREW
87		SDSP2606Z	SCREW,X3
88		SDST2606Z	TAPPING SCREW
98		PQ43295A	MOTOR BRAKE ASSY,INCL.99
99		PQ43296	SPRING

4.5 PACKING ASSEMBLY <M1>



#	REF NO.	PART NO.	PART NAME, DESCRIPTION

			* 1. PACKING ASSEMBLY <M1> *

1	PQ31705-102		PACKING CASE, E
2	PQ31705-100		PACKING CASE, EG
3	PQ31706A-1		CUSHION ASSY
4	PQ41026-8		PROTECT SHEET
5	PQM30021-59-11		POLY BAG
6	PU59168-3		RF CABLE
7	OR PU59167-3		RF CABLE
8	UM-3DJ2P		BATTERY,X2
	QPGA020-02003		POLY BAG

#	REF NO.	PART NO.	PART NAME, DESCRIPTION
9	PU30425-951		INSTRUCTIONS, E
10	PU30425-950		INSTRUCTIONS, EG
	TCN-3379		TAPE CATALOG
11	BT-20069A		WARRANTY CARD, EG
13	QPGA025-03505		POLY BAG
14	PQ10344BC		REMOTE CONTROLLER,INCL.15, EG
15	PQ10344BM-15		REMOTE CONTROLLER,INCL.15, E
	PQ31323		BATTERY CAP

SECTION 5

ELECTRICAL PARTS LIST

SAFETY PRECAUTION

Parts identified by the $\triangle$ symbol are critical for safety. Replace only with specified part numbers.

ABBREVIATIONS IN THIS LIST ARE AS FOLLOWS:

RESISTORS—All resistance values are in ohms (Ω), unless otherwise indicated.

k	: 1,000 (Kilo)
M	: 1,000,000 (Mega)
Chip R	: Chip Resistor
Chip VR	: Chip Variable Resistor
Comp. R	: Composition Resistor
CR	: Carbon Film Resistor
FR	: Fusible Resistor
MFR	: Metal Film Resistor
MPR	: Metal Plate Resistor
OMR	: Oxide Metal Film Resistor
PMR	: Precision Metal Film Resistor
UFR	: Unflammable Resistor
VR	: Variable Resistor (Potentiometer)
WR	: Wire Wound Resistor

CAPACITORS—All capacitance values are in μF , unless otherwise indicated.

pF	: $\mu\mu\text{F}$ (Pico farad)
C Cap	: Ceramic Capacitor
Chip Cap	: Chip Capacitor
Chip T Cap	: Chip Tantalum Capacitor
E Cap	: Electrolytic Capacitor
FM Cap	: Film Mica Capacitor
LL Cap	: Low Leak Current Electrolytic Capacitor
MM Cap	: Metalized Mylar Capacitor
MP Cap	: Metalized Paper Capacitor
MY Cap	: Mylar Capacitor
NP Cap	: Non-polar Capacitor
PC Cap	: Polycarbonate Capacitor
PP Cap	: Polypropylene Capacitor
PS Cap	: Polystyrol Capacitor
T Cap	: Tantalum Capacitor
TF Cap	: Thin Film Capacitor
TR Cap	: Trimmer Capacitor

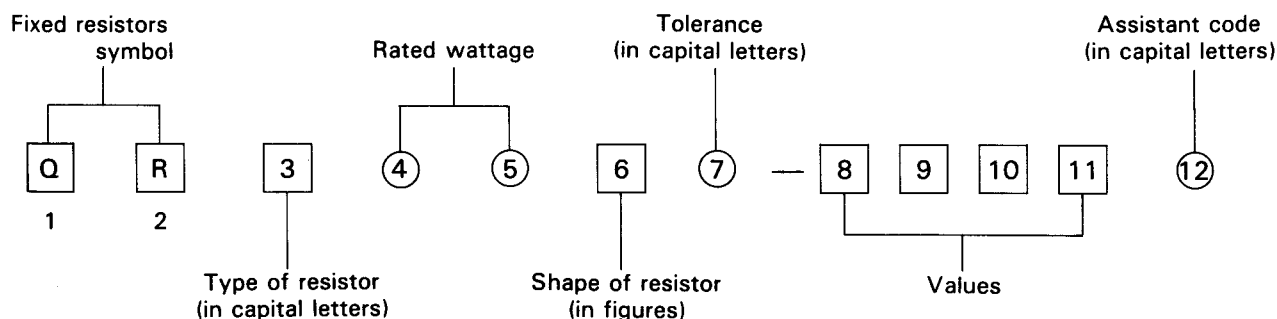
NOTES:

- [M] indicates mechanical symbol number.
- [2 digits] indicates circuit board symbol number.
- "X " indicates quantity per set.

5.1 STANDARD PART NUMBER CODING

5.1.1 Fixed resistor coding

Fixed resistor part numbers are as follows.



Type of resistor (third digit)	Rated wattage (fourth and fifth digits)	Tolerance (seventh digit)	Assistant code (twelfth digit)
C Composition resistors	A0 1/10 W	F ±1 %	A Small type
D Carbon film resistors	18 1/8 W	G ±2 %	B Small type
F Unflammable resistors	16 1/6 W	J ±5 %	S Small type
G Oxide metal film resistors	14 1/4 W	K ±10 %	Y Lead tapping
H Fusible resistors	12 1/2 W	M ±20 %	Z Lead tapping
M Metal plate resistors	01 1 W		
S Metal glazed resistors	02 2 W		
V Precision metal film resistors	03 3 W		
W Wire wound resistors	04 4 W		
X Metal film resistors	05 5 W		
Z Special resistors	06 6 W		
	07 7 W		
	75 7.5 W		
	08 8 W		
	10 10 W		
	15 15 W		
	A6 16 W		
	20 20 W		
	30 30 W		

Values (eighth — tenth or eleventh digits)
examples:
R47 0.47 Ω
4R7 4.7 Ω
470 47 × 10 ⁰ 47 Ω
471 47 × 10 ¹ 470 Ω
472 47 × 10 ² 4.7 kΩ
473 47 × 10 ³ 47 kΩ
474 47 × 10 ⁴ 470 kΩ
475 47 × 10 ⁵ 4.7 MΩ

QVR resistance shown by four digits:

4640 464 × 10 ⁰ 464 Ω
4641 464 × 10 ¹ 4.64 kΩ
4642 464 × 10 ² 46.4 kΩ

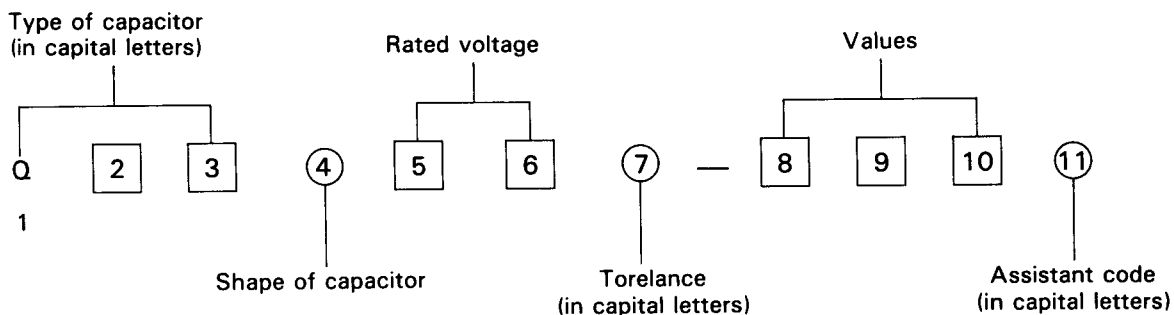
Shape of resistor (sixth digit)

Note:  indicates flame retardant resistor.

Type of resistor Shape of resistor	C	D	F	G	H	M	S	V	W	X
1										
2										
3										
4										
5									(L) type	
6										
7			Lug (B) type							
8			Lug (A) type							
9			Lug (C) type				Chip			

5.1.2 Fixed capacitor coding

Fixed capacitor part numbers are as follows.



Ceramic capacitors

Type of capacitor (first — third digits)		Shape of capacitor (fourth digit)				
		Mono-direction	Kink lead	Axial lead	Axial forming lead	Chip
Symbol	Characteristics					
QCC	Ceramic	1		4	5	
QCD	High capacitance					A
QCF	High capacitance	1,4	3			8,A
QCS	Temperature compensation	1	3	4	5	8,A
QCT	Temperature compensation	Special coding				8,A
QCV	Ceramic			1	3	
QCX	Ceramic			1	3	
QCY	High capacitance	1,4	3	6	7	8,A
QCZ	Special type	Special coding				
QCB	Ceramic			B	C	

Electrolytic capacitors

Type of capacitor (first — third digits)		Shape of capacitor (fourth digit)				
		Tubular	Mono-direction	Anti-stress	Forming	Snap-in
Symbol	Characteristics					
QEB	Low leakage		4	5	6	
QEC	Low leakage		4,8,A	9,B	6,C	
QEE	Tantalum (normal)		4	5	6	
	Tantalum (small)		8			
QEF	Chip tantalum	8 (chip type)				
QEG	Low impedance		4			
QEK	Miniature type		4	5	6	
QEL	Small type		4	5	6	7
QEM	Small type		4,A	5	6	
QEN	Non-polar	2	4	5	6	
QEP	Non-polar (small)		4,A	5,B	6,C	
QER	Miniature type		4	5	6	
QET	Small type	2	4,A	5,B	6,C	7
QEU	Small type		4	5	6	
QEV	Small type		4		6	7
QEW	Normal	2	4	5	6	7

Paper film capacitors

Type of capacitor (first — third digits)		Shape of capacitor (fourth digit)				
		Tubular	Normal		Flame retardant	
Symbol	Characteristics		Mono-direction	Kink lead	Mono-direction	Kink lead
QFA	Metalized polypropylene				7	
QFE	Metalized mylar				5	
QFF	Film mica		4			
QFG	Polypropylene film		4	8		
QFH	Metalized mylar	2	4	3	5,7	6
QFJ	Mylar (special)		4			
QFK	Metalized mylar (small)				5	
QFM	Mylar	2	4	3,7	5	6
QFN	Mylar (small)		4	3		
QFP	Polypropylene		4	3,8		
QFS	Polystyrole	2	4	3		
QFV	Thin film		4	8		
QFZ	Special type	Special coding				

Rated voltage (fifth and sixth digits)

Sixth digit Fifth digit	A	B	C	D	E	F	G	H	J	K	V	W	X
0						3.15	4.0		6.3				
1	10		16	20	25		40	50	63	80	35		
2	100	125	160	200	250	315	400	500	630		350	450	600
3	1000	1250		2000				5000					

Tolerance (seventh digit)

A	+100 -10 %	M	± 20 %
F	± 1 %	N	± 30 %
G	± 2 %	P	+100 -0 %
H	+50 -10 %	R	+30 -10 %
J	± 5 %	X	+40 -20 %
K	± 10 %	Z	+80 -20 %

Values (eighth — tenth digits)

Example : Values are in picofarads

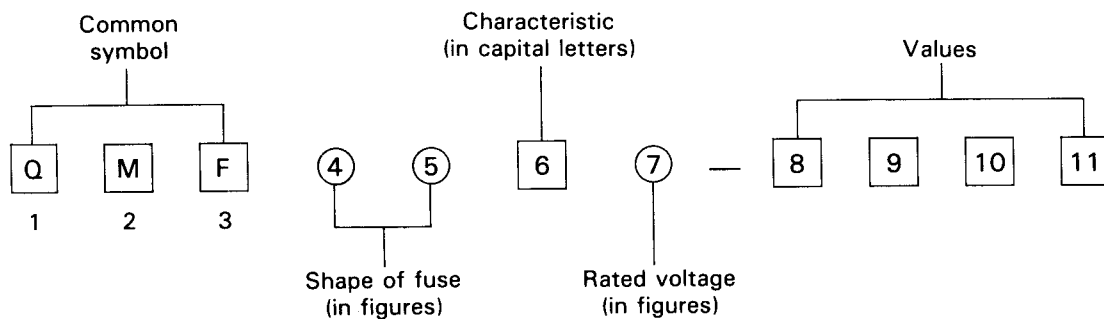
101	.....	10×10^1 pF	.....	100 pF
102	.....	10×10^2 pF	.....	1,000 pF (0.001 μ F)
103	.....	10×10^3 pF	.....	10,000 pF (0.01 μ F)
104	.....	10×10^4 pF	.....	100,000 pF (0.1 μ F)
105	.....	10×10^5 pF	.....	1 μ F
5R0	.....		.....	5.0 pF

Assistant code (eleventh digit)

G	Small size
Z	Lead tapping
Y	Lead tapping

5.1.3 Fuse coding

Standard fuse part numbers are as follows.



Shape of fuse

(fourth and fifth digits)

51	φ5.2×20 mm
60	φ6.4×30 mm
61	φ6.35×31.8 mm
63	φ6.4×30 mm with lead wires
66	φ6.35×31.8 mm with lead wires
00	Special type

Rated voltage (seventh digit)

1	AC125 V
2	AC250 V
3	0.1—1 A : AC250 V 1.25—6.3 A : AC125 V

Values

(eighth-tenth or eleventh digits)

example:

R63	.....	0.63 A
1R0	.....	1.0 A
2R5	.....	2.5 A
100	.....	10 A
R315	.....	0.315 A
1R25	.....	1.25 A

Characteristics (sixth digit)

Symbol	Fusing Current	Fusing Time	Remarks
A	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 — 10 sec.	
	400 %	0.15 — 3 sec.	
	1000 %	0.02 — 0.3 sec.	
B	210 %	Within 30 min.	Regular fusible type (for SEMKO, Europe)
	275 %	0.05 — 2 sec.	
	400 %	0.01 — 0.3 sec.	
C	135 %	Within 1 hr.	Regular fusible type (for UL, Japan)
	200 %	Within 2 min.	
E	210 %	Within 2 min.	Anti-rush type (for Europe)
	275 %	0.6 — 10 sec.	
	400 %	0.15 — 3 sec.	
	1000 %	0.02 — 0.3 sec.	
J	135 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
M	135 %	Within 1 hr.	Regular fusible type (for UL)
	200 %	Within 2 min.	
R	160 %	Within 1 hr.	Regular fusible type
	200 %	Within 2 min.	
S	160 %	Within 1 hr.	Anti-rush type
	200 %	Within 2 min.	
	700 % — 2000 %	Within 0.01 sec.	
U	135 %	Within 1 hr.	Anti-rush type (for UL)
	200 %	Within 2 min.	
	800 % — 2000 %	Within 0.01 sec.	

#	REF NO.	PART NO.	PART NAME, DESCRIPTION

			* POWER TRANSFORMER BOARD ASSY <01> *

PWBA	PB20005A-01		POWER TRANS BOARD ASSY
Q1	2SA720		TRANSISTOR
D1	11E2		DIODE
	OR 11ES2		DIODE
	OR 1SR35-200A		DIODE
	OR S5688G		DIODE
	OR ERA15-02		DIODE
D2	11E2		DIODE
	OR 11ES2		DIODE
	OR 1SR35-200A		DIODE
	OR S5688G		DIODE
	OR ERA15-02		DIODE
D3	11E2		DIODE
	OR 11ES2		DIODE
	OR 1SR35-200A		DIODE
	OR S5688G		DIODE
	OR ERA15-02		DIODE
D4	11E2		DIODE
	OR 11ES2		DIODE
	OR 1SR35-200A		DIODE
	OR S5688G		DIODE
	OR ERA15-02		DIODE
D5	11E2		DIODE
	OR 11ES2		DIODE
	OR 1SR35-200A		DIODE
	OR S5688G		DIODE
	OR ERA15-02		DIODE
D6	11E2		DIODE
	OR 11ES2		DIODE
	OR 1SR35-200A		DIODE
	OR S5688G		DIODE
	OR ERA15-02		DIODE
D7	11E2		DIODE
	OR 11ES2		DIODE
	OR 1SR35-200A		DIODE
	OR S5688G		DIODE
	OR ERA15-02		DIODE
D8	11E2		DIODE
	OR 11ES2		DIODE
	OR 1SR35-200A		DIODE
	OR S5688G		DIODE
	OR ERA15-02		DIODE
D9	11E2		DIODE
	OR 11ES2		DIODE
	OR 1SR35-200A		DIODE
	OR S5688G		DIODE
	OR ERA15-02		DIODE
D10	11E2		DIODE
	OR 11ES2		DIODE
	OR 1SR35-200A		DIODE
	OR S5688G		DIODE
	OR ERA15-02		DIODE
D11	11E2		DIODE
	OR 11ES2		DIODE
	OR 1SR35-200A		DIODE
	OR S5688G		DIODE
	OR ERA15-02		DIODE
D12	HZ30-2		ZENER DIODE
DS1	S4VB10-F2		BRIDGE DIODE
△ R1	QRZ0052-100		F RESISTOR
R2	QRD181J-224		RESISTOR

#	REF NO.	PART NO.	PART NAME, DESCRIPTION

			R3 QRD181J-222 RESISTOR
			R4 QRD181J-822 RESISTOR
△	R5	QRZ0052-221	F RESISTOR
	R6	QRD181J-121	RESISTOR
			C1 QETB1EM-228 E CAPACITOR
			C2 QETB1EM-228 E CAPACITOR
			C3 QETB1CM-478 E CAPACITOR
			C4 QETB1JM-107 E CAPACITOR
			C5 QETB1JM-107 E CAPACITOR
			C6 QETC1VM-106 E CAPACITOR
			C7 QETC1HM-226 E CAPACITOR
			C9 QFK52AK-473 M CAPACITOR
△	C101	QCZ9016-472P	CAPACITOR
△	HD1	PU57505	FUSE CLIP,X6, FOR F1,F2,F3
△	LF1	PU60088	LINE FILTER
△	LF2	PU60089	LINE FILTER
△	TAB1	A74316	TAB,X2
			CN1 PU59555-6 CAP HOUSING
			CN2 PU59555-6 CAP HOUSING
△	F1	QMF51E2-R63	FUSE,DOES NOT INCLUDE.
△	F2	QMF51E2-2R0	FUSE, "
△	F3	QMF51E2-R80	FUSE, "

			* MAIN BOARD ASSEMBLY <03>&<44> *

PWBA	PB10082B-01		MAIN BOARD ASSY, E
	PB10082A-01		MAIN BOARD ASSY, EG
△	RF1	PU59980S	RF CONVERTER/MIX BOOSTER
	RV1	PU52105	P RIVET,X2
	TB1	PU60192B	CONNECTOR BOARD, E
		PU60192A	CONNECTOR BOARD, EG
	WR1	PW30401-AB22T	COAXIAL CORD,RF CONV
			-AUDIO SECTION-
△	IC1	BA7751ALS	IC
			Q1 2SC1740S(RS) TRANSISTOR
			Q3 2SC1740S(RS) TRANSISTOR
			Q5 2SC1740S(RS) TRANSISTOR
			Q6 DTA124ES TRANSISTOR
			Q7 DTA114ES TRANSISTOR
			Q8 2SC1740S(RS) TRANSISTOR
			Q9 2SC1740S(RS) TRANSISTOR
			Q10 2SC1740S(RS) TRANSISTOR
			Q11 DTA114ES TRANSISTOR
			Q12 DTA114ES TRANSISTOR
			Q13 2SD1450S,T TRANSISTOR
			Q14 DTC124ES TRANSISTOR
			D1 1SS133 DIODE
		OR MA165	DIODE
			D2 1SS133 DIODE
		OR MA165	DIODE

#△	REF NO.	PART NO.	PART NAME, DESCRIPTION
R1		QRD161J-473	RESISTOR
R2		QRD161J-152	RESISTOR
R3		QRD161J-222	RESISTOR
R6		QRD161J-471	RESISTOR
R7		QRD161J-103	RESISTOR
R8		QRD161J-152	RESISTOR
R9		QRD161J-222	RESISTOR
R13		QRD161J-223	RESISTOR
R14		QRD161J-102	RESISTOR
R15		QRD161J-223	RESISTOR
R16		QRD161J-102	RESISTOR
R17		QRD161J-102	RESISTOR
R20		QRD161J-103	RESISTOR
R21		QRD161J-333	RESISTOR
R22		QRD161J-102	RESISTOR
R23		QRD161J-223	RESISTOR
R25		QRD161J-223	RESISTOR
R26		QRD161J-100	RESISTOR
R27		QRD161J-470	RESISTOR
R28		QRD161J-393	RESISTOR
R29		QRD161J-221	RESISTOR
R30		QRD161J-224	RESISTOR
R31		QRD161J-123	RESISTOR
R33		QVZ3518-103	V RESISTOR,PB LEVEL
R34		QRD161J-103	RESISTOR
R35		QRD161J-122	RESISTOR
R36		QRD161J-472	RESISTOR
R37		QRD161J-393	RESISTOR
R38		QRD161J-183	RESISTOR
R39		QRD161J-821	RESISTOR
R40		QRD161J-121	RESISTOR
R41		QVZ3518-473	V RESISTOR,BIAS ADJ
R42		QRD161J-333	RESISTOR
R43		QRD161J-150	RESISTOR
R44		QRD161J-104	RESISTOR
C1		QETB1CM-336	E CAPACITOR
C2		QETC1HM-105	E CAPACITOR
C3		QCC11EJ-682	CAPACITOR
C4		QETC1CM-336	E CAPACITOR
C5		QETC1EM-475	E CAPACITOR
C7		QCB81HJ-102	CAPACITOR
C8		QEB51HM-105	E CAPACITOR
C9		QETC1CM-106	E CAPACITOR
C10		QCC11EJ-103	CAPACITOR
C11		QETC1HM-105	E CAPACITOR
C12		QETC1HM-105	E CAPACITOR
C13		QETC1CM-226	E CAPACITOR
C14		QETC1HM-225	E CAPACITOR
C15		QETC1HM-105	E CAPACITOR
C16		QETC1CM-106	E CAPACITOR
C18		QFV71HJ-273	M CAPACITOR
C19		QCB81HJ-331	CAPACITOR
C20		QFV71HJ-683	M CAPACITOR
C21		QETC1CM-106	E CAPACITOR
C22		QCC11EJ-472	CAPACITOR
C23		QCC11EJ-103	CAPACITOR
C24		QCC11EK-272	CAPACITOR
C25		QETC1CM-106	E CAPACITOR
C26		QETC1CM-336	E CAPACITOR
C27		QCVB1CN-103	CAPACITOR
C28		QCB81HJ-102	CAPACITOR
L1		PU58308-822J	COIL
L2		PU59152-3R9K	PEAKING COIL
L3(R45)		PU48530-471J	PEAKING COIL
LC1		PU59736-271	N FILTER

#△	REF NO.	PART NO.	PART NAME, DESCRIPTION
		OR PU59885-271	N FILTER
	LC2	PU59736-271	N FILTER
		OR PU59885-271	N FILTER
△	T1	PU60017-2	OSC TRANS
	TP	PU57545	TEST PIN,X3
-LUMINANCE SECTION-			
	IC101	PB20166C	Y MODULE BOARD ASSY
△	IC102	MSM6967RS	IC
	Q101	2SC1740S(RS)	TRANSISTOR
	Q102	2SC1740S(RS)	TRANSISTOR
	Q103	2SA1309R,S	TRANSISTOR
	Q104	2SC1740S(RS)	TRANSISTOR
	Q105	2SC1740S(RS)	TRANSISTOR
	Q106	2SA1309R,S	TRANSISTOR
	Q107	2SA1309R,S	TRANSISTOR
	Q110	DTC144WS	TRANSISTOR
	Q111	DTC124ES	TRANSISTOR
	Q113	DTC114YS	TRANSISTOR
	Q114	DTC144EF	TRANSISTOR
	Q121	2SC1740S(RS)	TRANSISTOR
	D101	1SS133	DIODE
	OR	MA165	DIODE
	D102	1SS133	DIODE
	OR	MA165	DIODE
	D103	1SS133	DIODE
	OR	MA165	DIODE
	D104	RD9.1ESB2	ZENER DIODE
	D105	1SS133	DIODE
	OR	MA165	DIODE
	D106	1SS133	DIODE
	OR	MA165	DIODE
	D109	1SS133	DIODE
	OR	MA165	DIODE
	D110	1SS133	DIODE
	OR	MA165	DIODE
	D111	MA27W(A)	DIODE
	D112	1SS133	DIODE
	OR	MA165	DIODE
	D113	1SS292	DIODE
	R101	QRD161J-103	RESISTOR
	R102	QRD161J-182	RESISTOR
	R103	QRD161J-222	RESISTOR
	R104	QRD161J-331	RESISTOR
	R105	QVZ3531-152	V RESISTOR,REC FM LEVEL
	R108	QRD161J-681	RESISTOR
	R109	QRD161J-331	RESISTOR
	R110	QRD161J-333	RESISTOR
	R111	QRD161J-102	RESISTOR
	R112	QVZ3518-222	V RESISTOR,NC BALANCE
	R113	QRD161J-222	RESISTOR
	R114	QRD161J-102	RESISTOR
	R115	QRD161J-181	RESISTOR
	R116	QRD161J-750	RESISTOR
	R117	QRD161J-102	RESISTOR
	R119	QRD121J-391	RESISTOR
	R120	QRD161J-333	RESISTOR
	R121	QRD161J-681	RESISTOR
	R122	QRD161J-153	RESISTOR
	R123	QRD161J-152	RESISTOR
	R124	QRD161J-101	RESISTOR

#△	REF NO.	PART NO.	PART NAME, DESCRIPTION	#△	REF NO.	PART NO.	PART NAME, DESCRIPTION
R127		QVZ3531-332	V RESISTOR,FREQ RESPONSE	C139		QETC0JM-476	E CAPACITOR
R128		QRD161J-102	RESISTOR	C140		QCVB1CN-103	CAPACITOR
R129		QRD161J-102	RESISTOR				
R130		QRD161J-222	RESISTOR	C141		QCVB1CN-103	CAPACITOR
				C142		QCVB1CN-103	CAPACITOR
R134		QRD161J-750	RESISTOR	C143		QCF11HP-103	CAPACITOR
R138		QRD161J-104	RESISTOR	C145		QCSB1HJ-120	CAPACITOR
R139		QRD161J-823	RESISTOR	C146		QCB81HJ-151	CAPACITOR
				C147		QCC11EK-104	CAPACITOR
R141		QRD161J-122	RESISTOR	C148		QCVB1CN-103	CAPACITOR
R142		QRD161J-681	RESISTOR	C149		QEN61AM-226	NP E CAPACITOR
R143		QRD161J-331	RESISTOR	C150		QETC1EM-475	E CAPACITOR
R144		QRD161J-472	RESISTOR				
R147		QRD161J-562	RESISTOR	C152		QCSB1HJ-120	CAPACITOR
R148		QRD161J-223	RESISTOR	C153		QCB81HJ-102	CAPACITOR
R149		QRD161J-103	RESISTOR	C154		QCB81HJ-102	CAPACITOR
R150		QRD161J-222	RESISTOR	C155		QCB81HJ-102	CAPACITOR
				C156		QEN50JM-336	NP E CAPACITOR
R152		QRD161J-101	RESISTOR				
R153		QRD161J-682	RESISTOR	C161		QCVB1CN-103	CAPACITOR
R154		QRD161J-222	RESISTOR	C162		QCVB1CN-103	CAPACITOR
R155		QRD161J-681	RESISTOR				
R160		QRD161J-221	RESISTOR	L101		PU59152-121J	PEAKING COIL
				L102		PU59152-221J	PEAKING COIL
R161		QRD161J-153	RESISTOR	L103		PU59152-560J	PEAKING COIL
R162		QRD161J-221	RESISTOR	L104		PU59152-330J	PEAKING COIL
R163		QRD161J-222	RESISTOR	L105		PU59152-101J	PEAKING COIL
R164		QRD161J-394	RESISTOR	L106		PU48530-101K	PEAKING COIL
R165		QRD161J-103	RESISTOR	L107		PU48530-101K	PEAKING COIL
				L108		PU59152-680J	PEAKING COIL
R171		QRD161J-222	RESISTOR	L109		PU48530-101K	PEAKING COIL
R172		QRD161J-222	RESISTOR	L110		PU59152-180J	PEAKING COIL
R173		QRD161J-681	RESISTOR				
				L111		PU48530-101K	PEAKING COIL
C101		QCSB1HJ-220	CAPACITOR	L112		PU48530-101K	PEAKING COIL
C102		QETC1AM-226	E CAPACITOR	L113		PU48530-101K	PEAKING COIL
C103		QETC1HM-335	E CAPACITOR	L114		PU59152-101J	PEAKING COIL
C104		QCVB1CN-103	CAPACITOR				
C105		QCB81HJ-121	CAPACITOR	EQ101		PU60162	EQUALIZER
C106		QCB81HJ-121	CAPACITOR	EQ102		PU54838	EQUALIZER
C107		QCSB1HJ-220	CAPACITOR				
C108		QEN61HM-225	NP E CAPACITOR	LPF101		PU60161	LOW PASS FILTER
C109		QETC1EM-475	E CAPACITOR	LPF102		PU58021-2	LOW PASS FILTER
C110		QCSB1HJ-120	CAPACITOR				
				SLD101		PU60147	SHIELD CASE(1)
C111		QETC1HM-104	E CAPACITOR	SLD102		PU60148	SHIELD CASE(2)
C112		QETC1EM-475	E CAPACITOR	SLD103		PU60149	SHIELD CASE(3)
C113		QCVB1CN-103	CAPACITOR				
C114		QCVB1CN-103	CAPACITOR	TP		PU57545	TEST PIN,X4
C115		QCVB1CN-103	CAPACITOR				
C116		QETC0JM-476	E CAPACITOR	CN104		PU58844-3	CAP HOUSING, E
C117		QETC1AM-476	E CAPACITOR	CN105		PU58844-4	CAP HOUSING, E
C118		QCVB1CN-103	CAPACITOR				
C120		QCVB1CN-103	CAPACITOR				
C121		QETC1CM-106	E CAPACITOR				
C122		QETC1HM-224	E CAPACITOR				
C123		QETC1EM-335	E CAPACITOR				
C124		QETC0JM-337	E CAPACITOR				
C125		QEN61EM-335	NP E CAPACITOR				
C126		QCVB1CN-103	CAPACITOR				
C127		QCVB1CN-103	CAPACITOR				
C128		QCSB1HJ-470	CAPACITOR				
C129		QETC0JM-476	E CAPACITOR				
C130		QCVB1CN-103	CAPACITOR				
C131		QETC0JM-477	E CAPACITOR				
C132		QETC0JM-476	E CAPACITOR				
C133		QCVB1CN-103	CAPACITOR				
C134		QETC1EM-476	E CAPACITOR				
C135		QCB81HJ-102	CAPACITOR				
C136		QCB81HJ-102	CAPACITOR				
C137		QETC1EM-475	E CAPACITOR				
C138		QCSB1HK-6R8	CAPACITOR				

-VIDEO SUB BOARD SECTION-

PWBA1 PB40016A VIDEO SUB BOARD ASSY

IC103 TA7374P IC

Q112 2SC2021R,S TRANSISTOR

R158 QRD162J-102 RESISTOR

R159 QRD162J-332 RESISTOR

L115 PU59152-3R3K PEAKING COIL

L116 PU59152-150J PEAKING COIL

L117 PU59152-120J PEAKING COIL

TML101 PU59935-09 TERMINAL,JP101

-COLOR SECTION-

△ IC201 PU22046A C.MODULE BOARD ASSY

#△ REF NO.	PART NO.	PART NAME, DESCRIPTION	#△ REF NO.	PART NO.	PART NAME, DESCRIPTION
Q201	DTC144ES	TRANSISTOR	R223	QRD161J-473	RESISTOR
Q202	DTC144ES	TRANSISTOR	R224	QRD161J-102	RESISTOR
Q203	2SC1740S(RS)	TRANSISTOR	R225	QRD161J-102	RESISTOR
Q204	2SC1740S(RS)	TRANSISTOR	R226	QRD161J-391	RESISTOR
Q205	2SC1740S(RS)	TRANSISTOR	R227	QRD161J-221	RESISTOR
Q206	DTC124ES	TRANSISTOR	R230	QRD161J-561	RESISTOR
Q207	2SC1740S(RS)	TRANSISTOR			
Q209	DTC144ES	TRANSISTOR	R231	QRD161J-271	RESISTOR
Q210	DTC144ES	TRANSISTOR	R232	QRD162J-562	RESISTOR
			R233	QRD162J-104	RESISTOR
Q212	DTC144ES	TRANSISTOR	R234	QRD161J-682	RESISTOR
Q213	2SC1740S(RS)	TRANSISTOR	R235	QRD161J-122	RESISTOR
Q214	2SC1740S(RS)	TRANSISTOR	R236	QRD161J-393	RESISTOR
			R237	QRD161J-103	RESISTOR
Q252	2SC1740S(RS)	TRANSISTOR	R238	QRD161J-103	RESISTOR
			R239	QRD161J-102	RESISTOR
Q301	DTC144WS	TRANSISTOR	R240	QRD161J-471	RESISTOR
Q302	2SA1309R,S	TRANSISTOR			
Q303	2SA1309R,S	TRANSISTOR	R241	QRD161J-152	RESISTOR
Q304	DTC144WS	TRANSISTOR	R242	QRD161J-223	RESISTOR
			R243	QRD161J-682	RESISTOR
D201	1SS133	DIODE	R244	QRD161J-102	RESISTOR
OR MA165		DIODE	R245	QRD161J-181	RESISTOR
D202	1SS133	DIODE	R246	QRD161J-391	RESISTOR
OR MA165		DIODE	R247	QRD161J-331	RESISTOR
D203	1SS133	DIODE	R248	QRD161J-122	RESISTOR
OR MA165		DIODE	R249	QRD161J-222	RESISTOR
D204	1SS133	DIODE			
OR MA165		DIODE	R262	QRD161J-393	RESISTOR
D205	1SS133	DIODE	R263	QRD161J-223	RESISTOR
OR MA165		DIODE	R264	QRD161J-333	RESISTOR
D206	1SS133	DIODE	R265	QRD161J-822	RESISTOR
OR MA165		DIODE			
D207	1SS133	DIODE	R301	QRD161J-103	RESISTOR
OR MA165		DIODE	R304	QRD161J-393	RESISTOR
D208	1SS133	DIODE	R305	QRD161J-682	RESISTOR
OR MA165		DIODE	R306	QRD161J-393	RESISTOR
			R307	QRD161J-682	RESISTOR
D251	1SS133	DIODE	R308	QRD161J-103	RESISTOR
D252	1SS133	DIODE	R309	QRD161J-562	RESISTOR
D253	1SS133	DIODE			
D254	1SS133	DIODE	C201	QETC1CM-106	E CAPACITOR
OR MA165		DIODE	C202	QCVB1CN-103	CAPACITOR
D255	1SS133	DIODE	C203	QFN31HJ-273	M CAPACITOR
D256	1SS133	DIODE	C204	QCT25CH-220	CAPACITOR
D257	1SS133	DIODE	C205	QFN31HJ-223	M CAPACITOR
			C206	QETC1HM-105	E CAPACITOR
D301	1SS133	DIODE	C207	QCVB1CN-103	CAPACITOR
OR MA165		DIODE	C208	QCSB1HJ-470	CAPACITOR
D302	1SS133	DIODE	C209	QFN31HJ-473	M CAPACITOR
D303	1SS133	DIODE	C210	QCB1HJ-102	CAPACITOR
R201	QRD161J-222	RESISTOR	C211	QCVB1CN-103	CAPACITOR
R202	QRD161J-122	RESISTOR	C212	QCB1HJ-820	CAPACITOR
R203	QRD161J-103	RESISTOR	C213	QETC1HM-225	E CAPACITOR
R204	QRD161J-103	RESISTOR	C214	QETC1CM-106	E CAPACITOR
R205	QRD161J-223	RESISTOR	C215	QFN31HJ-563	M CAPACITOR
R206	QRD161J-103	RESISTOR	C216	QFN31HJ-224	M CAPACITOR
R207	QVZ3518-223	V RESISTOR,VXO	C217	QETC1CM-106	E CAPACITOR
R208	QRD161J-274	RESISTOR	C218	QFN31HJ-103	M CAPACITOR
R209	QRD161J-472	RESISTOR	C219	QFN31HJ-104	M CAPACITOR
R210	QRD161J-102	RESISTOR	C220	QCVB1CN-103	CAPACITOR
R211	QRD161J-681	RESISTOR	C221	QETC1EM-335	E CAPACITOR
R214	QVZ3518-331	V RESISTOR,REC COLOUR LEVEL	C222	QFN31HJ-563	M CAPACITOR
R215	QRD161J-153	RESISTOR	C223	QCVB1CN-103	CAPACITOR
R216	QRD161J-222	RESISTOR	C224	QETC1EM-475	E CAPACITOR
R217	QRD161J-102	RESISTOR	C225	QETC0JM-107	E CAPACITOR
R218	QRD161J-102	RESISTOR	C226	QCVB1CN-103	CAPACITOR
R219	QRD161J-103	RESISTOR	C227	QCB1HJ-101	CAPACITOR
R220	QRD161J-103	RESISTOR	C229	QETC1HM-105	E CAPACITOR
			C230	QETC1EM-475	E CAPACITOR
R221	QRD161J-272	RESISTOR			
R222	QRD161J-681	RESISTOR	C231	QETC1EM-475	E CAPACITOR

#△	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C232	QCVB1CN-103	CAPACITOR
	C233	QCB1HJ-102	CAPACITOR
	C234	QETC0JM-476	E CAPACITOR
	C235	QCVB1CN-103	CAPACITOR
	C236	QCSB1HK-5R6	CAPACITOR
	C237	QCVB1CN-103	CAPACITOR
	C238	QCVB1CN-103	CAPACITOR
	C259	QCB1HJ-102	CAPACITOR
	L201	PU48530-101K	PEAKING COIL
	L202	PU48530-271J	PEAKING COIL
	L203	PU48530-222J	PEAKING COIL
	L204	PU59153-822J	PEAKING COIL
	L205	PU59153-101K	INDUCTOR
	L206	PU59152-150J	PEAKING COIL
	L207	PU48530-101J	PEAKING COIL
	L208	PU59152-820J	PEAKING COIL
	L301	PU48530-101K	PEAKING COIL
	EQ201	PU53501-6	EQUALIZER
	LPF201	PU58705	LOW PASS FILTER
	LPF202	PU54988	LOW PASS FILTER
	BPF201	PU57072	BAND PASS FILTER
	BPF202	PU54410-2	BAND PASS FILTER
	DL201	PU58971-2	2H DELAY LINE
		OR PU59413	2H DELAY LINE
△	XB201	PU58023	CRYSTAL BLOCK
△		OR PU58126	CRYSTAL BLOCK
	X201	PU60307	CRYSTAL RESONATOR
		OR PU59335	CRYSTAL RESONATOR
		OR PU31449-4K	CRYSTAL RESONATOR
	TP	PU57545	TEST PIN,X3
	TP214	PU50766-2	TEST PIN
-SECAM DET BOARD SECTION <44>-			
	PWBA2	PB30005A-01	SECAM DET. BOARD ASSY
	IC251	BA7007	IC
	Q251	2SC1740S(RS)	TRANSISTOR
	R251	QRD161J-103	RESISTOR
	R252	QRD161J-562	RESISTOR
	R253	QRD161J-333	RESISTOR
	R254	QRD161J-393	RESISTOR
	R255	QRD161J-102	RESISTOR
	R256	QRD161J-393	RESISTOR
	R257	QVZ3521-472	V RESISTOR,SECAM DET
	R258	QRD161J-563	RESISTOR
	R259	QRD161J-182	RESISTOR
	R260	QRD161J-154	RESISTOR
	R261	QRD161J-332	RESISTOR
	C251	QFN31HJ-562	M CAPACITOR
	C252	QCVB1CN-103	CAPACITOR
	C253	QETC1CM-106	E CAPACITOR
	C254	QFN31HJ-223	M CAPACITOR
	C255	QER61CM-476	E CAPACITOR
	C256	QCVB1CN-103	CAPACITOR
	C257	QETC1AM-336	E CAPACITOR
	C258	QFN31HJ-122	M CAPACITOR
	L251	PU49057	LC BLOCK

#△	REF NO.	PART NO.	PART NAME, DESCRIPTION
	L252	PU59153-562J	PEAKING COIL
	L253	PU48530-101K	PEAKING COIL
	CF251	PU56983	CERAMIC FILTER
	TML251	PU60330-10	TERMINAL,JP251
	TP251	PU57545	TEST PIN
-SERVO SECTION-			
	IC401	HD49712NT	IC
		OR HD49712ANT	IC
	Q402	2SC3311A	TRANSISTOR
	D401	1SS133	DIODE
		OR MA165	DIODE
	D402	1SS133	DIODE
		OR MA165	DIODE
	D403	1SS133	DIODE
		OR MA165	DIODE
	D404	1SS133	DIODE
		OR MA165	DIODE
	D405	1SS133	DIODE
		OR MA165	DIODE
	D407	1SS133	DIODE
		OR MA165	DIODE
	D408	1SS133	DIODE
		OR MA165	DIODE
	D409	1SS133	DIODE
		OR MA165	DIODE
	R401	QRD161J-102	RESISTOR
	R402	QRD161J-105	RESISTOR
	R403	QRD161J-103	RESISTOR
	R404	QRD161J-333	RESISTOR
	R405	QRD161J-684	RESISTOR
	R406	QRD161J-152	RESISTOR
	R409	QRD161J-475	RESISTOR
	R410	QRD161J-473	RESISTOR
	R411	QRD161J-222	RESISTOR
	R413	QRD161J-103	RESISTOR
	R414	QRD161J-472	RESISTOR
	R415	QRD161J-182	RESISTOR
	R416	QRD161J-105	RESISTOR
	R417	QRD161J-273	RESISTOR
	R418	QRD161J-105	RESISTOR
	R419	QRD161J-105	RESISTOR
	R420	QRD161J-273	RESISTOR
	R421	QRD161J-273	RESISTOR
	R422	QRD161J-105	RESISTOR
	R423	QRD161J-104	RESISTOR
	R424	QRD161J-222	RESISTOR
	R427	QRD161J-102	RESISTOR
	R428	QRD161J-104	RESISTOR
	R429	QRD161J-104	RESISTOR
	R430	QVZ3518-684	V RESISTOR,PB SW POINT
	R432	QRD161J-332	RESISTOR
	R433	QRD161J-103	RESISTOR
	R434	QVZ3521-474	V RESISTOR,V PULSE POSITION
	R436	QRD161J-102	RESISTOR
	R437	QRD161J-222	RESISTOR
	R438	QRD161J-221	RESISTOR
	R439	QRD161J-563	RESISTOR
	R440	QRD161J-153	RESISTOR
	R441	QRD161J-223	RESISTOR
	R442	QRD161J-682	RESISTOR
	R443	QRD161J-102	RESISTOR
	R444	QRD161J-102	RESISTOR

#△ REF NO.	PART NO.	PART NAME, DESCRIPTION	#△ REF NO.	PART NO.	PART NAME, DESCRIPTION
R445	QRD161J-103	RESISTOR	D607	HZS7.5EB2	ZENER DIODE
R446	QRD161J-102	RESISTOR	R601	QRD161J-152	RESISTOR
R447	QRD161J-103	RESISTOR	R602	QRD161J-103	RESISTOR
R448	QRD161J-334	RESISTOR	R603	QRD161J-103	RESISTOR
R453	QRD161J-471	RESISTOR	R604	QRD161J-122	RESISTOR
R454	QRD161J-183	RESISTOR	R605	QRD161J-823	RESISTOR
C401	QCB81HJ-102	CAPACITOR	R606	QRD161J-102	RESISTOR
C402	QETC1AM-226	E CAPACITOR	R607	QRD161J-102	RESISTOR
C403	QETC1AM-226	E CAPACITOR	R608	QRD161J-102	RESISTOR
C404	QCSB1HJ-150	CAPACITOR	R609	QRD161J-472	RESISTOR
C405	QCB81HJ-102	CAPACITOR	R610	QRD161J-103	RESISTOR
C406	QETC1HM-105	E CAPACITOR	R611	QRD161J-105	RESISTOR
C407	QCXB1CN-222	CAPACITOR	R614	QRD161J-472	RESISTOR
C408	QETC1HM-105	E CAPACITOR	R615	QRD161J-472	RESISTOR
C409	QCB81HJ-102	CAPACITOR	R616	QRD161J-472	RESISTOR
C410	QCB81HJ-102	CAPACITOR	R617	QRD161J-472	RESISTOR
C411	QETC1HM-224	E CAPACITOR	R618	QRD161J-472	RESISTOR
C412	QETC1AM-226	E CAPACITOR	R619	QRD161J-472	RESISTOR
C415	QFN31HJ-122	M CAPACITOR	R620	QRD161J-472	RESISTOR
OR	QCC31CK-122	CAPACITOR	R621	QRD161J-472	RESISTOR
C416	QETC1EM-475	E CAPACITOR	R622	QRD161J-472	RESISTOR
C417	QETC1EM-475	E CAPACITOR	R623	QRD161J-472	RESISTOR
C418	QETC1CM-106	E CAPACITOR	R624	QRD161J-472	RESISTOR
C419	QETC1CM-106	E CAPACITOR	R625	QRD161J-472	RESISTOR
C420	QEN61HM-105	NP E CAPACITOR	R626	QRD161J-472	RESISTOR
C421	QFV71HJ-104	M CAPACITOR	R627	QRD161J-472	RESISTOR
C422	QCB81HJ-471	CAPACITOR	R628	QRD161J-124	RESISTOR
C423	QFN31HJ-682	M CAPACITOR	R629	QRD161J-124	RESISTOR
C424	QCB81HJ-102	CAPACITOR	R630	QRD161J-333	RESISTOR
C425	QFV81HJ-334	TF CAPACITOR	R631	QRD161J-472	RESISTOR
C430	QETC1CM-106	E CAPACITOR	R632	QRD161J-332	RESISTOR
C431	QEK61HM-474	E CAPACITOR	R634	QRD161J-103	RESISTOR
C432	QCB81HJ-102	CAPACITOR	R635	QRD161J-331	RESISTOR
C433	QCB81HJ-102	CAPACITOR	R636	QRD161J-822	RESISTOR
C434	QCVB1CN-103	CAPACITOR	R642	QRD161J-124	RESISTOR
C435	QCB81HJ-102	CAPACITOR	R644	QRD161J-124	RESISTOR
C436	QCB81HJ-102	CAPACITOR	R648	QRD161J-153	RESISTOR
C437	QCB81HJ-101	CAPACITOR	R649	QRD181J-271	RESISTOR
TP	PU57545	TEST PIN,GND	RA602	QRB049J-103	RESISTOR ARRAY
TP401	PU57545	TEST PIN	OR	QRB047J-103	RESISTOR ARRAY
TP402	PU57545	TEST PIN	RA603	QRB049J-103	RESISTOR ARRAY
TP403	PU57545	TEST PIN	OR	QRB047J-103	RESISTOR ARRAY
TP411	PU57545	TEST PIN	C601	QCFB1EZ-223	CAPACITOR
CN402	PU58844-5	CAP HOUSING	C602	QCFB1EZ-223	CAPACITOR
-MECHACON SECTION-			C604	QETC1EM-335	E CAPACITOR
IC601	M50965-645SP	IC	C605	QETC1EM-475	E CAPACITOR
OR	M50965E-323SP	IC	C606	QETC1EM-475	E CAPACITOR
IC602	BA6259N	IC	C607	QETC1EM-475	E CAPACITOR
IC603	M54647L	IC	C608	QETC1HM-105	E CAPACITOR
IC604	BA6222	IC	C613	QCC11EK-473	CAPACITOR
Q601	2SC3311A(RS)	TRANSISTOR	C614	QCF31HP-223	CAPACITOR
D601	MA165	DIODE	C615	QCC11EK-223	CAPACITOR
OR	1SS133	DIODE	L601	PU59152-100J	PEAKING COIL
D602	MA165	DIODE	L602	PU59152-2R7J	PEAKING COIL
OR	1SS133	DIODE	△ CF601	PU60030	RESONATOR
D603	HZS4.3EB2	ZENER DIODE	△	OR PU60125	RESONATOR
D604	HZS7.5EB2	ZENER DIODE	HS601	PU60158	HEAT SINK
D605	MA165	DIODE	SCW601	SBSE3006Z	TAPPING SCREW,X2
OR	1SS133	DIODE	SCW602	SBSE3008Z	TAPPING SCREW
D606	1SS133	DIODE	WR601	PW30112-NOAF6AF	PARALLEL WIRE,CN601
OR	MA165	DIODE			

#△ REF NO.	PART NO.	PART NAME, DESCRIPTION	#△ REF NO.	PART NO.	PART NAME, DESCRIPTION
CN601	PU59934-15	WIRE HOLDER		OR DTC144ES	TRANSISTOR
CN603	PU59555-6	CAP HOUSING	Q15	2SC1740S(RS)	TRANSISTOR
CN604	PU59555-5	CAP HOUSING		OR 2SC3311A(RS)	TRANSISTOR
CN605	PU59555-8	CAP HOUSING			
CN606	PU58844-4	CAP HOUSING	D1	MTZ11B	ZENER DIODE
△ CP602	ICP-F25	CIRCUIT PROTECTOR		OR RD11ES-T1B2	ZENER DIODE
				OR UZ11BSB	ZENER DIODE
			D4	1SS133	DIODE
			D5	1SS133	DIODE
			D10	1SS133	DIODE
			R2	NRD718J-750NBU	RESISTOR
			R6	NRD718J-822NBU	RESISTOR
			R7	NRD718J-472NBU	RESISTOR
			R8	NRD718J-220NBU	RESISTOR
			R9	NRD718J-271NBU	RESISTOR
			R10	NRD718J-240NBU	RESISTOR
			R11	NRD718J-102NBU	RESISTOR
			R17	NRD718J-472NBU	RESISTOR
			R18	QVZ3518-102	V RESISTOR, RF AGC
			R19	NRD718J-102NBU	RESISTOR
			R22	NRD718J-103NBU	RESISTOR
			R23	NRD718J-472NBU	RESISTOR
			R24	NRD718J-103NBU	RESISTOR
			R25	NRD718J-103NBU	RESISTOR
			R28	NRD718J-103NBU	RESISTOR
			R29	NRD718J-102NBU	RESISTOR
			R30	NRD718J-394NBU	RESISTOR
			R31	NRD718J-334NBU	RESISTOR
			R32	NRD718J-272NBU	RESISTOR
			R34	NRD718J-561NBU	RESISTOR
			R35	NRD718J-331NBU	RESISTOR
			R36	NRD718J-102NBU	RESISTOR
			R37	NRD718J-271NBU	RESISTOR
			R39	NRD718J-153NBU	RESISTOR
			R42	NRD718J-152NBU	RESISTOR
			R43	QVZ3518-103	V RESISTOR, COLOR LEVEL
			R44	NRD718J-102NBU	RESISTOR
			R45	NRD718J-102NBU	RESISTOR
			R47	NRD718J-471NYU	RESISTOR
			R49	NRD718J-102NBU	RESISTOR
			R51	NRD718J-331NBU	RESISTOR
			R52	QVZ3518-471	V RESISTOR, Y LEVEL
			R53	NRD718J-102NBU	RESISTOR
			R56	NRD718J-222NBU	RESISTOR
			R61	NRD718J-471NBU	RESISTOR
			R62	NRD718J-104NYU	RESISTOR
			R63	NRD718J-223NBU	RESISTOR
			R64	NRD718J-392NBU	RESISTOR
			R65	NRD718J-103NBU	RESISTOR
			R66	NRD718J-471NBU	RESISTOR
			R67	NRD718J-223NBU	RESISTOR
			R68	NRD718J-223NBU	RESISTOR
			R69	NRD718J-103NYU	RESISTOR
			R90	NRD718J-274NBU	RESISTOR
			R91	NRD718J-473NYU	RESISTOR
			R92	NRD718J-473NYU	RESISTOR
			C5	NCX71CM-222NBR	CAPACITOR
			C6	NCX71CM-222NBR	CAPACITOR
			C7	NCX71CM-222NBR	CAPACITOR
			C8	NCX71CM-222NBR	CAPACITOR
			C11	PU57601-224MEZ	E CAPACITOR, 0.22/25
			C12	NCY71CM-103NBR	CAPACITOR
			C13	QEK61CM-476	E CAPACITOR

* IF BOARD ASSEMBLY <07> *					

PWBA	PB10007L-03	IF BOARD ASSY			
IC1	M51496P	IC			
Q1	2SC2636T	TRANSISTOR			
Q2	2SD1450S,T	TRANSISTOR			
	OR 2SD1468S(RSE)	TRANSISTOR			
Q3	2SC3399	TRANSISTOR			
	OR UN4213	TRANSISTOR			
	OR DTC144ES	TRANSISTOR			
Q4	2SC536SPA(FG)	TRANSISTOR			
	OR 2SC1740S(RS)	TRANSISTOR			
	OR 2SC3311A(RS)	TRANSISTOR			
Q5	2SA933S(RS)	TRANSISTOR			
	OR 2SA1309AR,S	TRANSISTOR			
Q6	2SC536SPA(FG)	TRANSISTOR			
	OR 2SC1740S(RS)	TRANSISTOR			
	OR 2SC3311A(RS)	TRANSISTOR			
Q7	2SA933S(RS)	TRANSISTOR			
	OR 2SA1309AR,S	TRANSISTOR			
Q8	2SC536SPA(FG)	TRANSISTOR			
	OR 2SC1740S(RS)	TRANSISTOR			
	OR 2SC3311A(RS)	TRANSISTOR			
Q9	2SD1450S,T	TRANSISTOR			
	OR 2SD1468S(RSE)	TRANSISTOR			
Q10	2SC536SPA(FG)	TRANSISTOR			
	OR 2SC1740S(RS)	TRANSISTOR			
	OR 2SC3311A(RS)	TRANSISTOR			
Q11	2SC536SPA(FG)	TRANSISTOR			
	OR 2SC1740S(RS)	TRANSISTOR			
	OR 2SC3311A(RS)	TRANSISTOR			
Q14	2SC3399	TRANSISTOR			
	OR UN4213	TRANSISTOR			

#	REF NO.	PART NO.	PART NAME, DESCRIPTION
	C14	NCX71CM-222NBR	CAPACITOR
	C17	QEK61CM-106	E CAPACITOR
	C18	NCY71CM-103NBR	CAPACITOR
	C19	QFL31HJ-182	CAPACITOR
	C21	NCS71HJ-330NBR	CAPACITOR
	C22	NCB71HK-101NBR	CAPACITOR
	C25	QCT25CH-270	CAPACITOR
	C32	NCS71HJ-470NBR	CAPACITOR
	C36	QEK61CM-336	E CAPACITOR
	C41	QEK61CM-226	E CAPACITOR
	C42	QEK61CM-336	E CAPACITOR
	C43	NCF71EZ-223NBR	CAPACITOR
	C44	QEK61HM-474	E CAPACITOR
	C70	QEK61CM-226	E CAPACITOR
	L2	PU60025-1R1	PEAKING COIL
	L3	PU60025-1R8	PEAKING COIL
	L5	PU59152-150J	PEAKING COIL
	L7	PU59152-220J	PEAKING COIL
	CF2	PU58558-2	CERAMIC FILTER
	CF4	PU32990-2	CERAMIC FILTER
	SAW1	PU35557-4	SAW FILTER
	T1	PU59982-2	IFT, LLD
	T2	PU59983-2	IFT, AFC
	T3	PU60046	IFT, SYNC
	T4	PU60176-2	IFT, S.DET
	TML1	PU59935-16	TERMINAL

 * TUNER CTL BOARD ASSEMBLY <08>&<35> *

PWBA PB20015S TUNER CTL BOARD ASSY, EG
 PB20015L-02 TUNER CTL BOARD ASSY, E
 -TUNER CTL BOARD SECTION <08>-

PWBA1 PB20015S1 TUNER CTL BOARD ASSY, EG
 PB20015L1-02 TUNER CTL BOARD ASSY, E

△ TNR1 PU36384-1-1 U/V TUNER, EG
 △ PU36384 U/V TUNER, E

IC1 LA7910 IC
 IC2 BA10358 IC
 OR M5223P IC
 IC3 BU4066B IC
 OR TC4066BP IC

Q1 2S8810H,J TRANSISTOR
 Q2 DTC144ES TRANSISTOR
 OR UN4213TA TRANSISTOR
 OR 2SC3399 TRANSISTOR
 Q4 2SA1309AR,S TRANSISTOR
 Q5 2SA720 TRANSISTOR
 OR 2SB1278(QR) TRANSISTOR
 Q6 2SC1740S(S) TRANSISTOR
 OR 2SC3311A(S) TRANSISTOR
 Q7 2SC1740S(RS) TRANSISTOR

#	REF NO.	PART NO.	PART NAME, DESCRIPTION
	Q8	OR 2SC3311A(RS)	TRANSISTOR
		OR 2SC536SPA(FG)	TRANSISTOR
		2SC1740S(RS)	TRANSISTOR
		OR 2SC536SPA(FG)	TRANSISTOR
		OR 2SC3311A(RS)	TRANSISTOR
	D1	LTZ-MR15	LE DIODE
	D2	HZT33-02	ZENER DIODE
	D3	1SS133	DIODE
	D4	MTZ5.1B	ZENER DIODE
		OR RD5.1ES-T1B2	ZENER DIODE
	D5	MTZ5.1B	ZENER DIODE
		OR RD5.1ES-T1B2	ZENER DIODE
	D6	1SS133	DIODE
	D7	1SS133	DIODE
	D8	1SS133	DIODE
	R1	QRD161J-182	RESISTOR
	R2	QRD161J-153	RESISTOR
	R5	QRD161J-181	RESISTOR
	R6	QRD161J-332	RESISTOR
	R7	QRD161J-473	RESISTOR
	R8	QRD161J-121	RESISTOR
	R9	QRD161J-473	RESISTOR
	R10	QRD161J-103	RESISTOR
	R11	QRD161J-103	RESISTOR
	R12	QRD161J-333	RESISTOR
	R13	QRD161J-331	RESISTOR
	R14	QRD161J-394	RESISTOR
	R15	QRD161J-154	RESISTOR
	R16	QRD161J-154	RESISTOR
	R17	QRD161J-154	RESISTOR
	R18	QRD161J-103	RESISTOR
	R19	QRD161J-103	RESISTOR
	R20	QRD161J-393	RESISTOR
	R25	QRD161J-472	RESISTOR
	R26	QRD161J-472	RESISTOR
	R27	QRD161J-104	RESISTOR
	R28	QRD161J-472	RESISTOR
	R29	QRD161J-472	RESISTOR
	R33	QRD161J-274	RESISTOR
	R35	QRD161J-472	RESISTOR
	R36	QRD161J-472	RESISTOR
	R37	QRD161J-123	RESISTOR
	R38	QRD161J-123	RESISTOR
	R40	QRD161J-333	RESISTOR
	R41	QRD161J-333	RESISTOR
	R42	QRD161J-103	RESISTOR
	R43	QRD161J-684	RESISTOR
	R44	QRD161J-563	RESISTOR
	R45	QRD161J-472	RESISTOR
	R46	QRD161J-473	RESISTOR
	R47	QRD161J-103	RESISTOR
	R48	QRD161J-103	RESISTOR
	R49	QRD161J-224	RESISTOR
	R50	QRD161J-334	RESISTOR
	R51	QRD161J-824	RESISTOR
	R52	QRD161J-154	RESISTOR
	R53	QRD161J-393	RESISTOR
	R54	QRD161J-334	RESISTOR
	R55	QRD161J-103	RESISTOR
	R56	QRD161J-103	RESISTOR
	R57	QRD161J-103	RESISTOR
	C2	QETC1CM-106	E CAPACITOR
	C4	QCB81HJ-101	CAPACITOR
	C5	QETC1HM-106	E CAPACITOR
	C7	QCVB1CM-103	CAPACITOR
	C8	QFV71HJ-333	M CAPACITOR

#△	REF NO.	PART NO.	PART NAME, DESCRIPTION
	TP	PU56008	TEST PIN,X6
	CN1	PU58844-4	CAP HOUSING
	CN2	PU58844-3	CAP HOUSING

* TIMER/DISPLAY BOARD ASSEMBLY <21> *			

	PWBA	PU22491B-02	TIMER/DISPLAY BOARD ASSY, E
		PU22491A-02	TIMER/DISPLAY BOARD ASSY, EG
	IC1	UPD75208CW-097	IC
		OR UPD75208CW-139	IC
	IC2	M5278L56	IC
	IC3	IC-PST523H-2	IC
	Q1	2SC3401	TRANSISTOR
		OR DTC144WS	TRANSISTOR
	D1	1SS133	DIODE
	D2	1SS133	DIODE
	D3	1SS133	DIODE
	D4	1SS132	DIODE
	D5	1SS132	DIODE
	D6	1SS132	DIODE
	D7	1SS132	DIODE
	D8	1SS132	DIODE
	D9	1SS132	DIODE
	D10	1SS132	DIODE
	D16	RD10ES-T1B2	ZENER DIODE
		OR UZ10BSB	ZENER DIODE
	D17	1SS133	DIODE
	D18	MA27TB	DIODE
	R2	QRD161J-224	RESISTOR
	R3	QRD161J-333	RESISTOR
	R4	QRD161J-102	RESISTOR
	R5	QRD161J-333	RESISTOR
	R6	QRD161J-273	RESISTOR
	R7	QRD161J-472	RESISTOR
	R9	QRD161J-103	RESISTOR
	R10	QRD161J-103	RESISTOR
	R11	QRD161J-103	RESISTOR
	R12	QRD161J-103	RESISTOR
	R14	QRD161J-103	RESISTOR
	R15	QRD161J-103	RESISTOR
	R16	QRD161J-103	RESISTOR
	R17	QRD161J-103	RESISTOR
	R18	QRD161J-103	RESISTOR
	R19	QRD161J-103	RESISTOR
	R22	QRD161J-102	RESISTOR
	R25	QRD161J-103	RESISTOR
	R26	QRD161J-103	RESISTOR
	R27	QRD161J-103	RESISTOR
	R28	QRD161J-103	RESISTOR
	R29	QRD161J-103	RESISTOR
	R30	QRD161J-103	RESISTOR
	R31	QRD161J-472	RESISTOR
	R32	QRD161J-472	RESISTOR
	R33	QRD161J-472	RESISTOR
	R34	QRD161J-472	RESISTOR
	R35	QRD161J-333	RESISTOR
	R36	QRD161J-333	RESISTOR

#△	REF NO.	PART NO.	PART NAME, DESCRIPTION
	R37	QRD161J-333	RESISTOR
	R38	QRD161J-102	RESISTOR
	R39	QRD161J-333	RESISTOR
	RA1	QRB057J-104	RESISTOR ARRAY
	RA2	QRB047J-224	RESISTOR ARRAY
	RA3	QRB077J-224	RESISTOR ARRAY
	C1	QER61CM-336	E CAPACITOR
	C2	QER60JM-336	E CAPACITOR
	C3	PU60177	E CAPACITOR, 0.022/5.5
	C6	QCVB1CN-103	CAPACITOR
	C7	QCVB1CN-103	CAPACITOR
	C8	QCVB1CN-103	CAPACITOR
	C9	QCVB1CN-103	CAPACITOR
	C10	QER61CM-106	E CAPACITOR
	C14	QER60JM-336	E CAPACITOR
	C16	QCC11EK-223	CAPACITOR
△	CF1	PU59545	RESONATOR
	S1	PU53598-2	TACT SWITCH,CLOCK ADJUST
	S2	PU53598-2	TACT SWITCH,PROGRAM
	S3	PU53598-2	TACT SWITCH,TIMER
	S4	PU53598-2	TACT SWITCH,SET(-)
	S5	PU53598-2	TACT SWITCH,CANCEL
	S6	PU53598-2	TACT SWITCH,REPEAT
	S7	PU53598-2	TACT SWITCH,SELECT
	S8	PU53598-2	TACT SWITCH,SET(+)
	S9	PU53598	TACT SWITCH,MODE
	S10	PU53598	TACT SWITCH,CHANNEL DOWN
	S12	PU53598-2	TACT SWITCH,CHANNEL SET
	S13	PU53598	TACT SWITCH,RESET
	S14	PU53598	TACT SWITCH,CHANNEL UP
	S210	PU53598-2	TACT SWITCH,TRACKING(+)
	S211	PU53598-2	TACT SWITCH,TRACKING(-)
	S402	PU58488-1-1	SLIDE SWITCH
	S403	PU58486-1-1	SLIDE SWITCH
	FDP1	PU59951-3	FLUORESCENT DISPLAY PANEL, EG
		PU59951-2	FLUORESCENT DISPLAY PANEL, E
	HD1	PQ31215-1-4	FDP HOLDER(R)
	HD2	PQ31163-1-4	FDP HOLDER(L)
	TP	PU56008	TEST PIN
	CN5	PU60169-7	HOUSING

* OPERATION BOARD ASSEMBLY <22> *			

	PWBA	PB20001A-01	OPERATION BOARD ASSY
	IC201	GP1U501	IFR UNIT
		OR SPS-403	IFR UNIT
	D200	MTZ5.1	ZENER DIODE
	D201	SLR-34VC3F	LE DIODE,POWER
	D202	SLR-34VC3F	LE DIODE,REC
	D203	SLR-34VC3F	LE DIODE,PAUSE
	D204	SLR-34MC3F	LE DIODE,PLAY

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#	REF NO.	PART NO.	PART NAME, DESCRIPTION
	ETH1	PQ40433-2	EARTH LUG
	SCW1	DPSP2606Z	SCREW
	SCW2	DPSP2606Z	SCREW,X2
	SLD1	PQ43281	SHIELD CASE
	SLD2	PQ43282	SHIELD PLATE
	SLD3	PQ43283	SHIELD COVER
	SPC1	WBS2600Z	T.LOCK WASHER
	TP	PU57545	TEST PIN,X3
	CN1	PU58844-8	CAP HOUSING
	CN2	PU59555-7	CAP HOUSING
	CN3	PU56258-10	CAP HOUSING

* FINE SLOW BOARD ASSEMBLY <47> *			

	PWBA	PB20175A	FINE SLOW BOARD ASSY
	IC1	BU2767S	IC
	Q4	DTA124ES	TRANSISTOR
		OR UN4112	TRANSISTOR
	D1	1SS133	DIODE
		OR MA165	DIODE
	D2	1SS133	DIODE
		OR MA165	DIODE
	D3	1SS133	DIODE
		OR MA165	DIODE
	R5	QRD161J-273	RESISTOR
	R6	QRD161J-153	RESISTOR
	R7	QRD161J-822	RESISTOR
	R8	QRD161J-472	RESISTOR
	R10	QRD161J-473	RESISTOR
	R12	QRD161J-472	RESISTOR
	R14	QRD161J-103	RESISTOR
	R15	QRD161J-102	RESISTOR
	R16	QRD161J-333	RESISTOR
	R17	QRD161J-274	RESISTOR
	R18	QRD161J-105	RESISTOR
	R19	QRD161J-334	RESISTOR
	R20	QRD161J-684	RESISTOR
	R21	QRD161J-154	RESISTOR
	R22	QRD161J-274	RESISTOR
	R23	QRD161J-104	RESISTOR
	R24	QRD161J-103	RESISTOR
	R25	QVZ3518-105	V RESISTOR,SLOW TRACKING
	R26	QRD161J-562	RESISTOR
	C2	QFN31HJ-224	M CAPACITOR
	C3	QET61HM-226	E CAPACITOR
	C4	QCBBIHJ-681	CAPACITOR
	C5	QCBBIHJ-471	CAPACITOR
	C6	QFN31HJ-393	M CAPACITOR
	C7	QFN31HJ-393	M CAPACITOR
	C8	QFN31HJ-104	M CAPACITOR
	C9	QFN31HJ-124	M CAPACITOR
	C10	QFN31HJ-393	M CAPACITOR
	C11	QCBBIHJ-102	CAPACITOR
	X1	PU60215	RESONATOR
	BKT1	PQ43307	BRACKET
	RV1	PU56800	NYLON RIVET
	SPC1	PQM30017-29	SLIT WASHER
	CN2	PU59555-5	CAP HOUSING
	CN3	PU58844-2	CAP HOUSING
	CN4	PU58844-2R	CAP HOUSING
	CN5	PU59555-6	CAP HOUSING
	CN6	PU58844-4	CAP HOUSING

#	REF NO.	PART NO.	PART NAME, DESCRIPTION

* DECK TERMINAL BOARD ASSEMBLY <51>&<53> *			

	PWBA	PU22509C-01	DECK TERMINAL BOARD ASSY
			-DECK TERMINAL BOARD SECTION <51>-
	PWBA1	PU22509A1-01	DECK TERMINAL BOARD ASSY
	R1	QRD181J-151	RESISTOR
	R3	QRD181J-331	RESISTOR
	PHS1	PU60271	PHOTO INTERRUPTER
	WR1	PW30110-26DD885	PARALLEL WIRE,CN1
	CN1	PU59933-15	WIRE TRAP
			-REC SAFETY BOARD SECTION <53>-
	PWBA3	PU22509A3	REC SAFETY BOARD ASSY
	S1	PU53644-1-3	REC SAFETY SWITCH

* RELAY BOARD ASSEMBLY <52> *			

	PWBA2	PU22509C2	RELAY BOARD ASSY
	LC1	PU59809-222T	N FILTER
	LC2	PU59809-222T	N FILTER
	WR2	PW30113-GOABZ62	PARALLEL WIRE

* END SENSOR BOARD ASSEMBLY <54> *			

	PWBA4	PU22509A4	END SENSOR BOARD ASSY
	Q1	PN268R-NC	PHOTO TRANSISTOR
	HD1	PQ31047	E.SENS.HOLDER
	CN1	PU59945-102	WIRE SOCKET

* CASSETTE HOUSING BOARD <56> *			

	PWBA	PB30043	CASSETTE HOUSING BOARD
	Q1	PN268R-NC	PHOTO TRANSISTOR
	R1	QRD161J-471	RESISTOR
	PHS1	PU58879	PHOTO INTERRUPTER
	CN1	PU58844-106	CAP HOUSING